COAL AGE

Vol. 7 NEW YORK, FEBRUARY 13, 1915 No. 7

The Driver *vs.* The Leader

By I. C. Parfitt

A Common Occurrence

A MOTOR with a large trip of loads is coming down a heavy grade. From defectiveness of brakes or other car mechanism, track deficiency or carelessness, a wreck occurs; timbers are knocked out; roof has fallen and the trolley wire is down.

General consternation reigns. The foreman appears upon the scene. "What in ——— is the matter *now*?"

Without taking time to look the situation over and formulate plans, he continues: "Now, you ——— get to work."

There's a noise like every one trying to do the same thing at the same time and doing it wrong.

"What are you doing there, you ———! Get out of the way! You don't know enough to slop a hog."

"Why in ——— don't you get busy there! Some of you good-for-nothing idiots, get hold of this car."

More noise as per above. Agitation increasing. Consternation beginning. Confusion reigning. Profanity and epithets (raining) likewise. Foreman busy everywhere, with his jaw.

Men busy everywhere doing little or nothing. Wasting energy. Becoming more excited and ineffectual, trying to obey contradictory orders. Excitement converging into lethargy. Personal abuse of the "wrong" man by foreman. Retaliation in kind. Man discharged.

Wreck finally cleared by bullheaded strength and awkwardness. Foreman retires from scene triumphant. *He* has done it all. Depression of spirits and prevalence of hard feelings among the men. Work automatic. Interest lacking. Loss of time twice or three times that required, but the foreman has demonstrated that he is—The Boss.

Another Wreck

A SIMILAR wreck occurs at another mine. The foreman arrives upon the scene. He takes a few moments to make a general survey of the conditions and size up the situation. Having formulated his plans, his orders and instructions are issued distinctly, intelligently and gentlemanly.

Encouraged and stimulated by his bearing, the orders are obeyed with promptness, intelligence and unanimity The work, under concentrated effort, progresses rapidly. In a short time the roadway is cleared, repaired and ready for operation.

The foreman questions the motorman and spragger as to the cause of the accident. His men, feeling assured that truthfulness is the best policy, soon place him in possession of the facts in the case. A mistake is considered, reprimanded and perhaps condoned. A willful or malicious act is visited with justice.

The mine work goes on with increased energy, interest and care.

Confidence is established and respect gained.

Query:—Which foreman is the efficient executive?

Driving Rock Tunnels at a Utah Coal Mine

By A. C. Watts*

SYNOPSIS—Most data on the driving of rock tunnels refer to work accomplished by individuals or firms specializing in this line. The work here described was done by an organization created for that purpose and recruited from the regular mine force. No specific attempts were made to break records.

As a general rule the only literature on driving rock tunnels is that descriptive of work in metal mines, or for irrigation, water supply and railroads. Such tunnels are usually driven by organizations specializing in this work and much effort is expended toward making records.

In coal-mining operations and the opening of new coal fields it is often necessary to drive rock tunnels but only small mention is made of them.

While, during the driving of the tunnels described herein, no special efforts were made to break any records the results attained were so good as to merit description.

The tunnels under discussion were necessary to open a new development adjacent to the Utah Fuel Co.'s Clear Creek mine No. 1, and were driven as haulage and air-course entries.

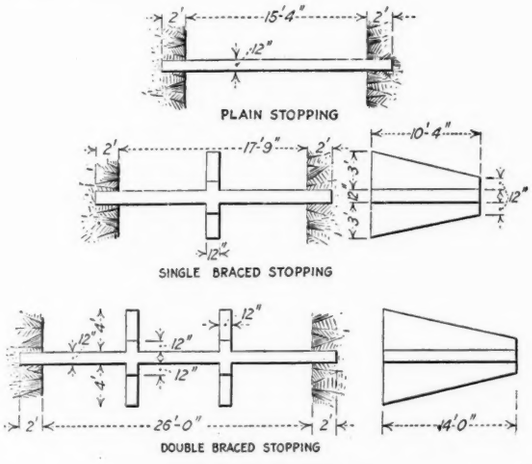
In order to systematize and expedite the work as much as possible a separate organization was created—made up of expert "hard-rock" men. Although kept distinct from the regular operating organization it was necessary to coördinate their work with that of the mine in order not to interfere with the production of coal.

Owing to the location of the tunnels it was possible to utilize the main haulage entry of the No. 1 Mine for the hauling out of waste rock and the taking in of supplies, while the power plant of the mine furnished power for compressors and electric haulage.

To determine the proper location and grade of these tunnels diamond-drill and surfacing prospecting was resorted to. The results developed the fact that the coal to be attacked lay just high enough above the old workings to prohibit locomotive haulage but not sufficiently high to give a properly balanced inclined plane. It was therefore decided to run on a ½ per cent. grade for the first half of the distance so as to permit locomotive haulage from the main entry of No. 1 Mine, and the last half on a 7½ per cent. grade to be operated with a double-drum hoist. The last half was laid with three rails from the upper parting in the coal to the lower parting in the rock with a double-track pass-by 300 ft. long, half way between the partings. The upper parting will have a grade just sufficient to permit loaded trips starting by gravity. The hoist for this plane will be equipped with motors sufficiently powerful to handle a loaded trip on the 7½ per cent. grade, to provide for derailments making it necessary to pull loaded trips back onto the track.

The starting points of the tunnels were laid out opposite the main haulage entry of No. 1 Mine about 2900 ft. from the mine portal so that the new territory would be entered about at its center. Approximately 600 ft. of entry was driven through the coal from the main haulage road of No. 1 Mine to reach the commencement of the main rock tunnel while the air-course tunnel was started from an old room which had been stopped against a fault. The lead from the main haulage road is a 200-ft. radius curve.

The main haulage rock tunnel was driven with a rectangular cross-section having a minimum height of 8 ft. and a minimum width of 10 ft., while the air course, of a similar cross-section, had minimum dimensions of 8 ft. in height and 12 ft. in width. Overbreakage and trimming have increased these dimensions on an average of one foot each way. Two tunnels were driven in order to provide for adequate ventilation of the new mine as it was impracticable to sink a shaft or drive an adit from the outside for air.



DETAIL OF COST PER CU. YARD

6 Stoppings and 1 overcast. Total 119.0 Cubic Yards
All hand work. Labor $3.15 per 8 Hrs. Carpenters $3.40 per 8 Hrs.

ITEM	LABOR	MATERIAL	TOTAL
Reinforcing Material (Scrap Iron)	$ 0.278		$ 0.278
Gathering & Distributing Gravel in Mine	2.683		2.683
Cement	0.076	$2.659	2.735
Forms	1.936	0.554	2.490
Redistribute Gravel, Mix & place Concrete	3.835 *		3.835
Totals	$ 8.808	$ 3.213	$ 12.021

Gravel hauled in winter. Difficult to redistribute gravel and place concrete on account of old workings

* INCLUDES COST OF MAKING OLD WORKINGS SAFE

Plan and Cost of Reinforced-Concrete Stoppings

The minimum width of 10 ft. in the haulageway allows ample width for locomotive haulage but the incline end of the tunnel was driven 12 ft. wide to allow for the three-rail balanced inclined plane. The widening operations were accomplished after the tunnels had been driven through to the coal.

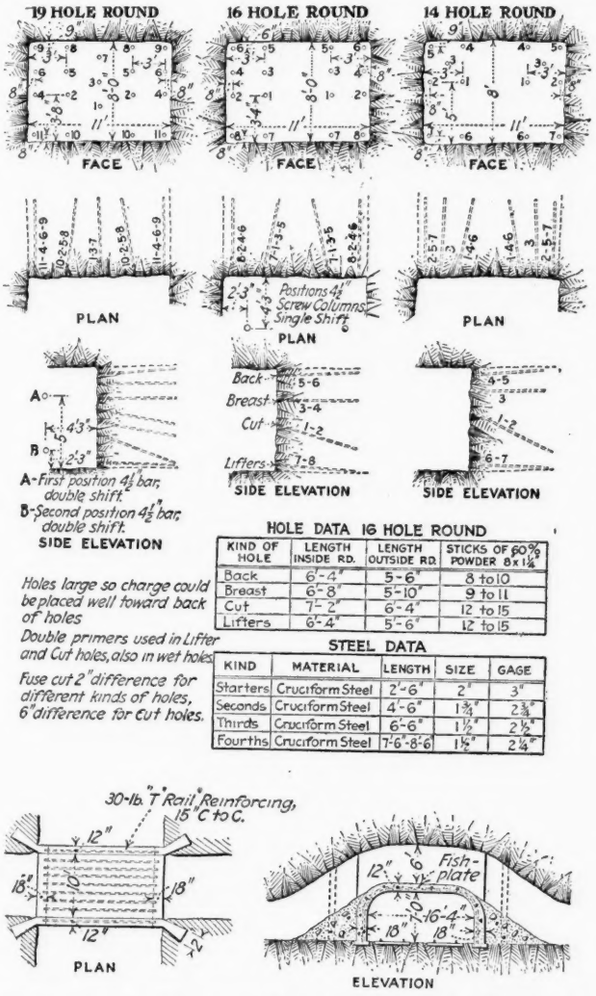
Sandstones and Shales Were Penetrated

The rock strata penetrated were sandstones and shales of medium hardness. The shales were the hardest to drill as the gumming of the cuttings made it difficult to keep the holes clean. The first halves of the tunnels, driven on a ½ per cent. grade, were parallel with the bedding planes of the strata and thus much harder to

*Utah Fuel Co., Castle Gate, Utah.

break. The last halves, driven on a 7½ per cent. grade, took the tunnels off the bedding planes somewhat but increased difficulties were encountered in the numerous small faults which were cut through as a main faulting plane was approached.

Generally, when these faults were struck, caving took place sometimes to twice the height of the tunnels, thus necessitating the moving of large amounts of muck. Temporary timbering was necessary at many of these places. At one point an air vent to the surface was encountered although the cover was probably from 400 to 600 ft. thick.


19 HOLE ROUND
16 HOLE ROUND
14 HOLE ROUND
FACE
PLAN
Positions 4½" Screw Columns Single Shift
SIDE ELEVATION
A-First position 4½" bar, double shift
B-Second position 4½" bar, double shift
Back
Breast
Cut
Lifters
Holes large so charge could be placed well toward back of holes
Double primers used in Lifter and Cut holes, also in wet holes
Fuse cut 2" difference for different kinds of holes, 6" difference for cut holes.

HOLE DATA 16 HOLE ROUND

KIND OF HOLE	LENGTH INSIDE RD.	LENGTH OUTSIDE RD.	STICKS OF 60% POWDER 8x1¼
Back	6'-4"	5'-6"	8 to 10
Breast	6'-8"	5'-10"	9 to 11
Cut	7'-2"	6'-4"	12 to 15
Lifters	6'-4"	5'-6"	12 to 15

STEEL DATA

KIND	MATERIAL	LENGTH	SIZE	GAGE
Starters	Cruciform Steel	2'-6"	2"	3"
Seconds	Cruciform Steel	4'-6"	1¾"	2¾"
Thirds	Cruciform Steel	6'-6"	1½"	2½"
Fourths	Cruciform Steel	7'-6"-8'-6"	1¼"	2¼"

DETAILS OF DRILLING IN TUNNEL FACE AND PLAN AND ELEVATION OF OVERCAST

At another place a flow of black damp was struck which drove the men out of the tunnels.

The breasts of the tunnels often presented alternating bands of sandstones and shales, or of thin seams of coal and bands of sandstones and shales which required constant study in the arrangement and drilling of the shot holes, and on account of the spongy, springy nature of the ground, together with the numerous fissures and splits some holes in the rounds would miss fire or fail to break the ground. When these missed shots occurred it was customary for the succeeding shift to fire them or redrill and fire other shots. For about two weeks the ground was so bad on account of slips, fissures and faults, which caused the first shots to cut off the later shots, that a man was left on duty to fire all missed holes before the succeeding shift came in.

On the average the ground was fair drilling but in some places it was necessary to use water under pressure to clean out holes so as to render it possible to drill them at all. In such cases the water, at 100 lb. pressure, was forced into the holes through ⅛-in. pipe 16 in. long used as a nozzle. The time necessary to drill the rounds varied from one hour and 45 min. to the full 8-hr. shift. The outside back holes were drilled first, then the outside breast holes, then the inside breast holes, and so on as shown in the accompanying sketches, the numbers designating the order of drilling.

THE COMPRESSED-AIR SUPPLY

The source of power was the power plant of the mine, consisting of six 125-hp. 72-in. by 16-ft. horizontal return-tubular boilers hand fired with slack or the poorest grade of run-of-mine coal coming from the mine, and two Thompson-Ryan generators of 175-kw. capacity, 320 amp. 500 volts, driven by 19x18-in. McEwan engines of 260 hp. each at 200 r.p.m. Power was charged against the work at the rate of 1.24c. per kilowatt-hour.

Current from the generators was conducted about 200 ft. to a 24x64-ft. combination compressor and blacksmith shop, 40 longitudinal feet of which was used for the compressors. Two Ingersoll-Rand compressors of the Imperial type No. 10, were used. These compressors had a rating of 427 cu.ft. of free air per minute at 175 r.p.m. at sea level. Each machine was driven through a belt connection from a 500-volt 116-amp. 75-hp. General Electric continuous-current motor operating at 850 r.p.m.

Air was conducted to two receivers in the compressor house, one being 3 ft. in diameter by 8 ft. 3 in. long and the other 3 ft. 6 in. by 8 ft., then into the mine through a 4-in. pipe 3725 ft. long to a 3-ft. 6-in. by 8-ft. receiver, thence 350 ft. through a 3-in. pipe line to the starting points of the tunnels and through 3-in. branch lines to within 50 ft. of the faces, 1-in. air hose being used from thence to the drills.

The compressors were placed outside the mine mainly to insure getting dry air as the atmosphere inside the mine contains a large amount of moisture due to the sprinkling of dust and the natural wet condition of parts of the mine. Furthermore by placing them in the same building as the blacksmith shop it was possible to effect a saving in the attendance cost. During the day shift the running of the compressors was left to the blacksmith and his helper. By having the compressors outside the mine no trouble whatever was experienced by the freezing of the air drills.

Drill steel was sharpened with a Numa rock-drill sharpener. For heavy blacksmith work the smith set up an old Sullivan coal puncher for a hammer. To do this required only the fitting on of a hammer-block 4x6x6 in. in place of the bit of the puncher, setting the machine on a suitable frame and making a foot control. The expense of this makeshift was slight but the saving effected in the cost and quality of the work was noticeable. For forge fires the smith used a combination of coke breeze and slack coal from the Sunnyside mines of the company with good results.

The coal dust was first made thoroughly wet and then compactly built around the tuyere of the forge in a semicircle about 3 ft. in diameter and 12 in. high. Fire

was kept up in the center with coke breeze. For one shift the material necessary to heat the drill steel amounted to one No. 7 wheelbarrow full of coal dust and 3 of coke breeze. The Sunnyside coal and coke used in this manner were found to make a splendid blacksmith fire, much better than by using ordinary coal partially coked.

Chicago giant rock drills, size 3¼ in., were used in driving while Ingersoll-Rand Jackhamers and Sullivan DA21 stoping drills were used for trimming and widening. Two drills were used at each face and were mounted as shown in accompanying drawing, one drill on each 4½-in. by 7-ft. double-screw column. In double-shift work, on account of the muck being in the way during the drilling of the first holes, it was necessary to mount the drills upon one 4½-in. by 10-ft. 6-in. single-screw bar with which was used a single-screw brace to the face to take up vibration of the bar. In this way the upper rows of holes were drilled first with the bar set near the roof and by the time these were completed the muck was cleared away from the face and the bar could be set up in a lower position and the remainder of the holes drilled. A 3-in. water main having ¾-in. hose connections was used along the back entry to within 50 ft. of the face. From these connections to the faces ¾-in. pipe was used with ⅛-in. by 16-in. special reducing nozzles.

For mucking plates sheet steel 4 and 5 ft. wide by 10 ft. long with two chains and ring handles at each end were used. These were laid for 20 ft. lengthwise of the entries up to within 4 ft. of the faces.

For rock disposal the ordinary end-dump mine cars built of wood were used. These held about 2.5 cu.yd. of material as loaded, the net weight of rock in the car being about 8100 lb. Cars were hauled by horses to a parting about 3500 ft. from the mouth of the mine. From this parting a 13-ton electric motor took them to the outside where they were dumped over ordinary goose-neck tipples. When the mine was working the motor hauled rock between trips of coal and whenever convenient. Eight to 10 cars made up the trip. Two tipples were used so that one could always be in a new position by the time the dumping space of the other was filled.

For framing timbers and making blocks and wedges a small sawmill was used. It consisted of one 36-in. circular cross-cut saw and one chisel-tooth rip saw, each connected to a 5-hp., 500-volt, direct-current motor. The method of timbering in bad ground is shown in the accompanying drawings.

Ventilation Was Secured by a Split

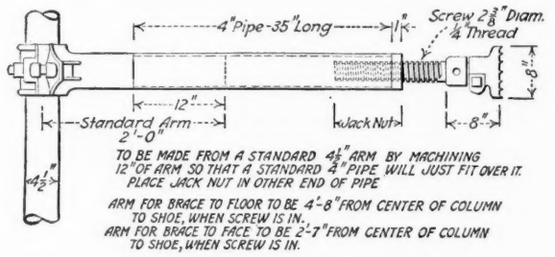
The main ventilation was accomplished, as in all coal mines, by giving the tunnels a separate split of air from the main ventilating system of the mine and driving crosscuts between them at regular intervals. To secure a separate split from the old mine it was necessary to build 6 concrete stoppings and one overcast. On account of the height of the stoppings they were built of reinforced concrete with reinforcing wings as shown in the accompanying drawing, old rails and wire rope being used for the reinforcing material. The reinforcement of the overcast was made with the same class of material. Ventilation at the faces of the tunnels was adequately accomplished from the drills when running. Before shifts went on any accumulated gases were driven out by opening the air cocks in the pipe lines and blowing.

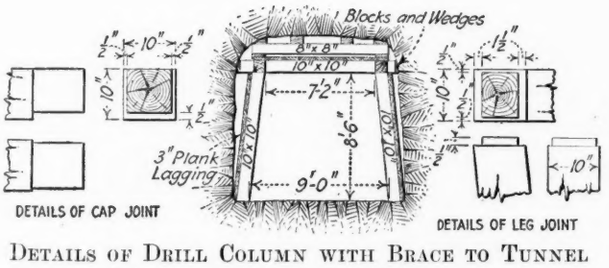
The powder used was mainly 60 per cent. dynamite with sticks 8 in. long and 1¼ in. in diameter. This came 84 sticks to the case. The caps employed were Hercules 6X, and the fuse Bear Brand and ZL.

Labor, Organization and Rates of Pay

On single shift the machine men worked during the day, that is, from 7:30 a.m. to 4 p.m., and the muckers and drivers during the night shift beginning at 8 p.m. and ending when the muck was cleaned out. The shift for the machine men, muckers and drivers, while nominally 8 hr., was considered finished whenever their work was completed, and more often than otherwise they would get through with their work before the 8 hr. was up. On double-shift work the muckers and drivers went on duty at 8 a.m. for the day and at 6 p.m. for the night shift, while the machine men went on at 9 a.m. and 7 p.m. for the respective shifts.

There were two machine men to each drill or four to each heading. The two machine men per drill alternated as runner and helper day by day. Both received the same wages which were $3.50 per shift of 8 hr. with a bonus


4"Pipe-35"Long
Screw 2⅜"Diam. ¼ Thread
12"
Standard Arm 2'-0"
Jack Nut
8"
TO BE MADE FROM A STANDARD 4½" ARM BY MACHINING 12" OF ARM SO THAT A STANDARD 4" PIPE WILL JUST FIT OVER IT. PLACE JACK NUT IN OTHER END OF PIPE
ARM FOR BRACE TO FLOOR TO BE 4'-8" FROM CENTER OF COLUMN TO SHOE, WHEN SCREW IS IN.
ARM FOR BRACE TO FACE TO BE 2'-7" FROM CENTER OF COLUMN TO SHOE, WHEN SCREW IS IN.



Details of Drill Column with Brace to Tunnel Face and Method of Timbering

of 10 per cent. of the day's wage for each foot over 3 ft. of tunnel driven that they averaged per shift. The bonus was calculated at the end of the month instead of each day, except in cases of men quitting before the end of the month. The average wages earned by this system by the machine men was $4.17 per shift. These men were required to do the drilling, extend both the air and water lines, make up primers, load and shoot holes.

Timbermen were paid the same wages as machine men including the bonus. There was comparatively little timbering to be done so that machine men were used for this work and it was thought fair to allow them the same wages as they would have earned if running machines.

There were four muckers to each heading who were paid $3.25 per 8-hr. shift and a bonus of 10 per cent. of the day's wage for each foot over three feet of tunnel driven per shift, just as paid the machine men. By this system the average wage earned by muckers was $3.84

per shift. The muckers laid all track, not including switches, put down the mucking sheets, loaded and unloaded drill steel and kept track clean for 100 ft. from the faces.

Drivers were paid $3.15 per 8-hr. shift without any bonus. They were required to take muck away from the faces to the parting, bring in empties and haul steel, powder, caps, fuse, rails, ties, etc., from parting to faces.

The dumpers outside were paid $3 and $3.15 per 8-hr. shift without any bonus. They were required to handle the rock—the extending of the tipples was done by the regular mine carpenters paid $3.40 and $3.15 per 8-hr. shift.

The blacksmith was paid $4 per 8-hr. shift and straight time for overtime. His duties were the sharpening of drill steel, general repairs and other blacksmith work.

The compressor attendants were paid $3.50 per 8-hr. shift and were required to run the compressors and assist the blacksmith.

The head foreman was paid $175 per month and his assistant $4.50 per 8-hr. shift.

Fortunately the tunnels were driven without any fatal or serious accidents.

UNIT COSTS OF STRAIGHT TUNNEL

Engineering		$0.0503
Superintendence		0.9885
Drilling	Machine men Machine men bonus	3.8221
Handling rock	Muckers Muckers' bonus Dumpers Extending dump	4.0331
Hauling	Drivers Motor men Shafts Stable expense Horse killed Ditch and track Tracks and switches	1.3193
Blacksmithing		0.3844
Power	P.H. charge Running compressor Repairs, compressor Pipe lines Repairs, drills	1.8604
Timbering		0.4389
Blasting material		2.7707
Machinery	Housing Setting Depreciation Miscellaneous	0.6655
Total cost per ft. of tunnels		$16.3332

The work of widening the main haulage tunnel for the pass-by and parting was done after the tunnels were driven to the coal. For this work Ingersoll-Rand Jackhamer drills with 7/8-in. hollow steel were used. The men were paid for straight time at the same rate as for tunnel driving, no bonus being given. The shots were detonated by electricity, using 6X detonators. A total lineal distance of 700 ft. 8 ft. high was widened from 3 to 5 ft., the unit cost for the work being as follows:

COST PER LINEAL FOOT OF WIDENING OPERATIONS

Superintendence		$0.4675
Drilling		0.3656
Handling rock	Muckers Dumpers Extend dump	1.3243
Hauling	Drivers Stable expense Motor men	0.3171
Blacksmithing		0.1712
Power	Compressor men Pipe lines	0.1681
Blasting material		0.5292
Miscellaneous		0.0486
Total cost per lin.ft.		$3.3916

If the cost of the widening operations is added to that of driving the tunnels the total expense per foot would be about $17, but if salvage is allowed on pipe and material left over and subsequently used for coal-mining operations the cost per foot is brought down to $15, which would be the net cost.

The average progress per shift for both single- and double-shift work during the whole time of driving the tunnels was 5.11 ft. The highest average per shift per month was 5.56 ft. The greatest distance driven in a tunnel in a single month was 323 ft. in 60 shifts.

Single-shift work was found to be less efficient than double-shift work, although to a certain extent this was due to the forming of a working organization and to the necessary experimenting with the drilling and shooting of the ground during the earlier stages of the undertaking.

Indiana's Mineral Output 80 Million Dollars

The principal mineral products of Indiana are coal, clay wares, cement, and stone, the aggregate value of these four substances in 1913 exceeding 90 per cent. of the total value of the output of the mines and quarries, according to a statement issued by the U. S. Geological Survey.

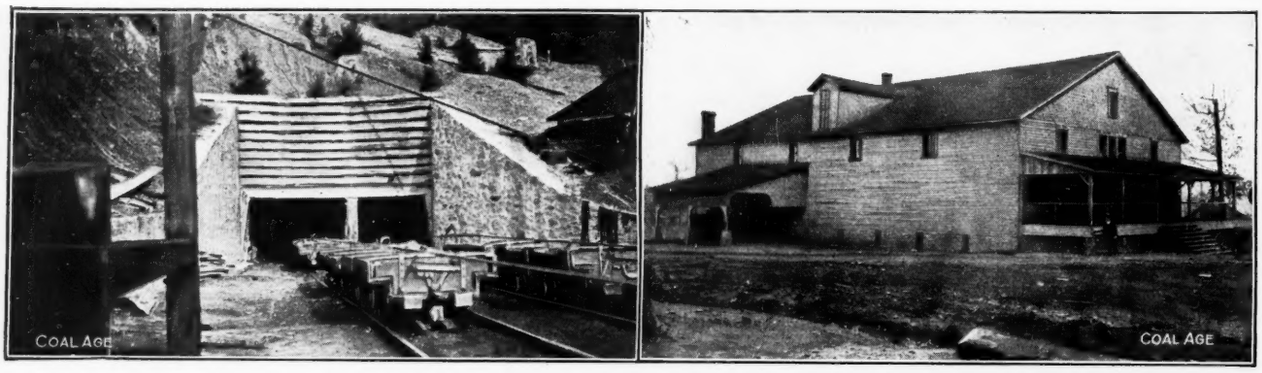
In 1913 the total value of the mineral production of Indiana was $46,607,864. To this total the coal mines contributed $19,001,881, the portland cement plants $10,218,867, the clay products $8,498,646, and the stone quarries $4,676,689. In 1912 the mineral output of the state was valued at $42,239,193, compared with which the production in 1913 shows an increase of $4,368,671, or over 10 per cent. These values do not include that of the pig iron produced in the state, which in 1912 exceeded $17,000,000 and in 1913 was over $20,600,000, nor do they include the value of the coke produced, which, in 1913, amounted to nearly $13,200,000. These two items make the sum total over $80,000,000. In the production of coal, which is the principal mineral product of the state, Indiana ranks seventh, with an output in 1913 amounting to 17,165,671 short tons, valued at $19,001,881, compared with 15,285,718 short tons, valued at $17,480,546, in 1912. The coal-producing counties are all in the southwestern part of the state and cover 6500 square miles.

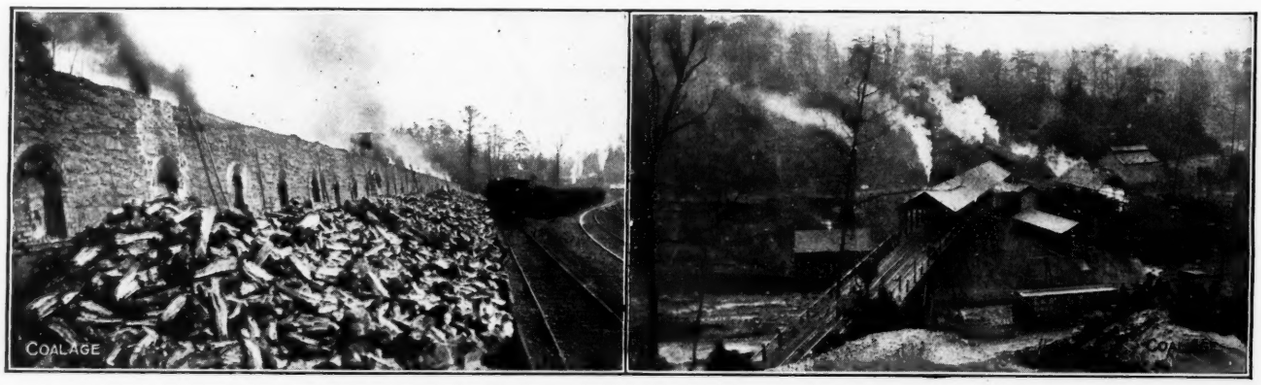
Since the completion of its plant of 560 retort coke ovens at Gary by the United States Steel Corporation, Indiana has assumed importance as a manufacturer of coke and has advanced from the relatively low place of seventeenth in 1910 to third in 1912 and 1913. In addition to the plant at Gary, there are 100 retort ovens at Indianapolis, 50 of which were completed in 1913, 22 at Muncie, and 66 at Indiana Harbor. Another plant of 41 ovens is under construction at Indianapolis. The production of coke in Indiana in 1913 amounted to 2,727,025 short tons, valued at $13,182,136, an increase from 2,616,339 short tons, valued at $12,528,685, in 1912.

Responsibility for Fall of Slate—A miner is not entitled to recover against his employer for injury caused by a fall of slate, if he and his buddy knocked down props which supported the slate, in moving a track. (Kentucky Court of Appeals; Stringer vs. York; 170 Southwestern Reporter, 527.)

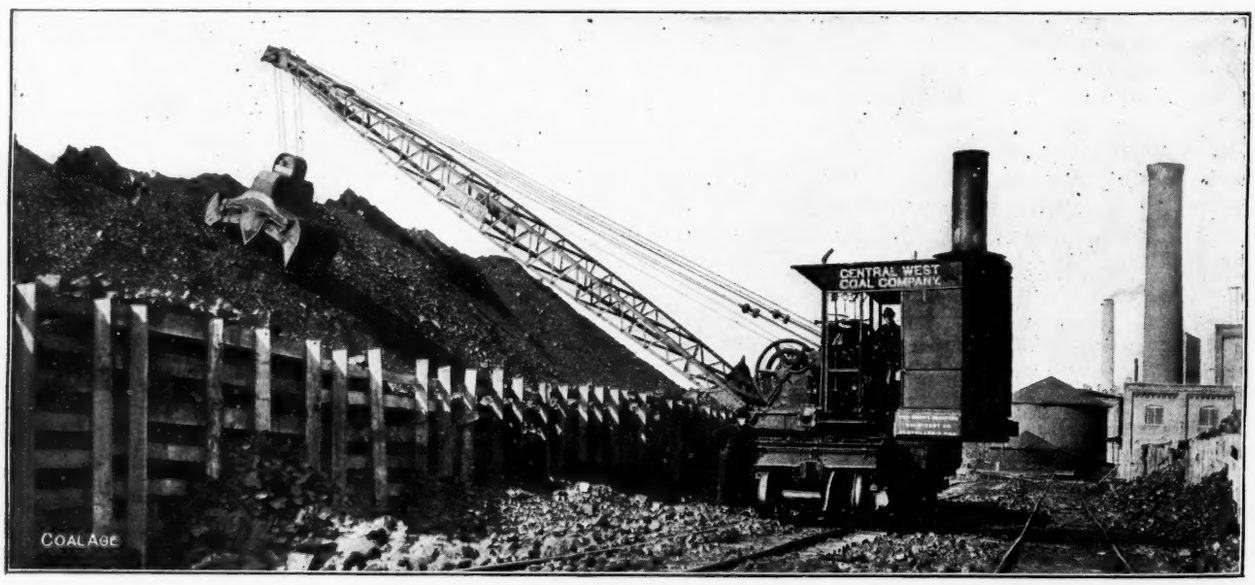
Duty to Make Mines Safe—The duty to make safe the place where a miner is extracting coal, being a duty not fixed by law, but by the mining contract, or, in the absence of a contract, by the rule or custom in force in the mine at the time, it is possible for the respective duties of the miner and the mine operator to vary in different mines. (Kentucky Court of Appeals; Patrick's Administrator vs. Eagle Coal Co.; 170 Southwestern Reporter, 960.)

Snapshots in Coal Mining



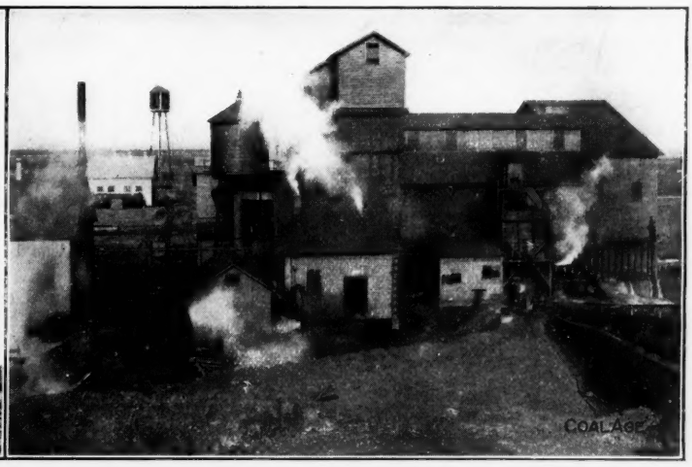


THE EMPIRE COAL CO.'S PLANT IN ALABAMA



BROWNHOIST 8-WHEEL 15-TON LOCOMOTIVE CRANE WITH 2-YD. COAL-GRAB BUCKET. CENTRAL WEST COAL CO., MENOMINEE, MICH.

Breaker Building of the Scranton Anthracite Coal Co. at Montana, Ark. A Fairly Good Grade of Anthracite Coal Is Mined in This Field



Washeries Nos. 1 and 2 of the Weir Coal & Coke Co. near Girard, Kan. These Washeries Are the Largest in Kansas

An Example of Good Timbering in the Auchincloss Mine of the D. L. & W. R.R. Co. Note Height of Roof as Compared with the Men Standing at Left of Gangway

A New Compensation Chart

By Leo Gluck*

As compensation laws are being enacted in several states, I have compiled a chart showing the present value of an annuity for the period of life a man might be expected to live if he had already attained a certain age. This period is known as the expectation of life. Let us suppose a man might be expected to furnish his wife $300 a year for the rest of his life to support herself and the children. Let us also assume he has arrived at the age of 30 years. According to the American table of mortality, it will be seen that he may be expected to live till

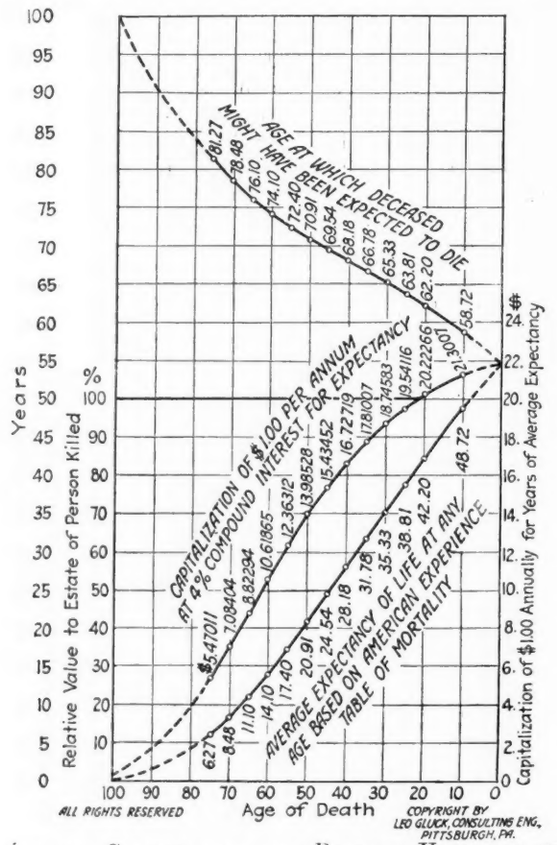

Years
Relative Value to Estate of Person Killed
%
Capitalization of $1.00 Annually for Years of Average Expectancy
$
Age of Death
AGE AT WHICH DECEASED MIGHT HAVE BEEN EXPECTED TO DIE
CAPITALIZATION OF $1.00 PER ANNUM AT 4% COMPOUND INTEREST FOR EXPECTANCY
AVERAGE EXPECTANCY OF LIFE AT ANY AGE BASED ON AMERICAN EXPERIENCE TABLE OF MORTALITY
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Table for Calculating the Present Value of the Income Which a Man Might Have Expected to Receive Had His Life Not Been Shortened by Accident

he is 65.33, for a long series of observations show that this is the average duration of life of those reaching 30 years. If he should be killed at that time, to provide the sum of money which at 4 per cent. would pay an annuity of $300, $300 × 18.7453 or $5623.59 would be required.

The base line of the figure is divided to show the age to which the man is supposed to have arrived when an accident occurs by which he is killed. This is termed the "age of death." From this base are plotted off ordinates showing how long the man might have been expected to live but for the untimely accident. A curve is drawn connecting these ordinates which shows the relation of expectation of life to the age at which the workman is killed. This is the lower curve on the table. The topmost curve is obtained by extending the ordinates so that they represent the expectancy of life plus the age attained—that is, the age at which the man might have expected to die had not the accident intervened.

There is a third curve between the other two based on a scale of ordinates on the right of the diagram. This curve shows what is the present value of an annuity of $1 a year for the whole period of expectancy—that is, for the length of time the man might have expected to live according to the tables of mortality had not the accident intervened by which he lost his life.

Suppose he is killed at 40 years of age. We look for 40 on the base line and follow up the ordinate from that point to the first curve and learn that he had at that time an expectancy of 28.18 years. Following the ordinate still further to the upper curve, we find that had he not been killed in the accident, he might have anticipated living to the ripe age of 68.18 (that is, 40 + 28.18) years. To provide his heirs with $1 per year for the period of 28.18 years, it is necessary to set aside $16.72719, and this figure will be found on the middle curve at the ordinate just mentioned which is located above the figure 40.

A horizontal line has been drawn from a point on the middle curve immediately at its intersection with the ordinate for 21 years. This line has been extended to the left of the figure and the ordinate length has been figured, appropriately from 0 to 100. The compensational equivalent due to a man's estate if he were killed at 21 years of age would be 20 times the annuity found to be due him. This is figured as 100 per cent. The relative magnitude of other compensations at other ages of death can be found by tracing up the ordinates for such ages as far as the middle curve and tracing the horizontal line to the left over to the scale just described. Thus the compensation for a man who is killed at 60 should be roughly 53 per cent. of that of a man cut off by accident at 21 years of age.

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German Coal Prices

At the last meeting of the committee of the Rhenish Westphalian Coal Syndicate the basis prices for blast-furnace coke and coal were declared unchanged for the first quarter of 1915, but higher prices were fixed for the period from Apr. 1 to Aug. 31, 1915—namely, an average advance of 47c. per ton for coal and briquettes. In the case of coke, however, concessions will be made for the same period averaging 35¼c. per ton. The selling prices will be fixed accordingly.

The advance for coal and briquettes is accounted for by the considerably enhanced working costs caused by the reduction of the production and the higher rates the mines have to pay for the necessary material.

The November statistics give the coal contract deliveries as 4,600,119 tons, against 6,036,509 tons last year. For account of the syndicate, deliveries in coal were 3,309,342 tons, against 4,388,138 tons; in coke, 548,466 tons, against 807,797 tons, and in briquettes 335,807 tons, against 320,705 tons last year. The total coal production for November was 5,753,293 tons, against 6,041,509 tons for October, and 7,801,848 tons for November last year.

Electrically Driven British Long-wall Coal Cutters

By S. F. Walker*

SYNOPSIS—Three distinct types of longwall machines are in general use, but the problems incident to driving are in large measure common to all. The method of transmitting alternating current to the machine and the kind of resistance employed in starting are described in detail.

Three types of electrical machines for longwall work are employed in the United Kingdom. These are the disk, the chain, and the bar coal cutters.

The bar coal cutter was the type first introduced, but has only recently established itself as a thoroughly efficient machine. The disk coal cutter was for a long time the favorite, probably mainly because it could be depended upon, provided of course that it was supplied with sufficient power. The bar machine possesses an advantage over the disk type, in that it requires less power for driving. On the other hand, it does not answer well when hard material is encountered.

A short time ago the makers of one of the leading bar machines, in a paper read before one of the institutes, strongly advocated cutting in the coal in place of the clay underlying it. It is believed by some that this course was advocated because of the difficulty experienced with this type of machine in cutting in heavy clay, while, as a rule, no trouble is experienced when cutting in coal.

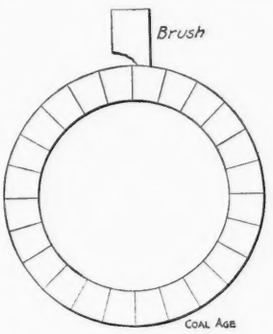


Fig. 1. Brush in Bad Condition

Broadly speaking, bar and disk machines are used for light and heavy work respectively; that is, when it is advantageous for any reason to cut in the underlying clay or in a parting of hard material, the disk machine is the more suitable; on the other hand, where the underlying material is soft, or where it is desirable to cut in the coal, the bar machine is making steady headway.

The chain machine, which is an adaptation of an American device introduced several years ago, stands halfway between the disk and the bar type. It will not perform the heavy work accomplished by the disk machine, but will negotiate difficulties which cannot always be successfully met by a machine of the bar type. It is also claimed for this cutter that it brings out the cuttings in small lumps instead of in dust.

Driving the Machine Is a Difficult Problem

The amount of power required by the various machines has an important bearing upon the question of drive. The successful driving of a coal-cutting machine by an electric motor is one of the most difficult problems the electrical engineer is called upon to solve. The space and weight allowable are necessarily small, and the conditions under which the motor and accessories have to work are such as to render operation extremely difficult.

The power required for driving the different types of coal-cutting machines varies widely. Bar machines sometimes work successfully with 10-hp. motors. Disk machines may require as much as 50 hp. The difference between an electric motor capable of furnishing 20 hp. maximum for a short time and the one which is required to develop 50 hp. for long intervals is considerable. The size and weight of the 50-hp. motor are necessarily much greater than those of the smaller machine.

All three forms of the longwall coal-cutting machine may be driven by either continuous or three-phase alternating-current motors. The distinguishing characteristic of the continuous-current motor is the fact that its armature carries a commutator built up of a number of segments of copper separated from each other by plates of mica. The current is delivered to the coils of the machine through carbon blocks or brushes bearing upon the surface of this commutator. Mining engineers distrust the direct-current motor, for, particularly under the conditions prevailing at the coal face, the commutator wears rapidly, and there is also the danger of sparking at the brushes igniting gas if the latter is present.

When the condition of the machine is perfect, the brushes carefully fitting upon the commutator, the face of the latter being true, sparking is reduced to a minimum, but there is nevertheless the danger that such a spark may ignite an explosive mixture, provided the latter is present in the machine case. Under working conditions both brushes and commutator are liable to wear, which materially increases the tendency to spark.

In such a case as that shown in Fig. 1, where the brush is making but poor contact with the commutator, pernicious sparking is liable to take place. Furthermore, while much has been done to render the case of an electric motor gas tight, this can never be accomplished. What is known as "breathing," which is the alternate inspiration and expulsion of air from the motor case due to varying temperatures of the machine when at work and when idle, allows ingress of a gaseous mixture if gas be present while the machine is cooling off. Instances are on record where explosions have taken place inside of motor cases.

Three-Phase Current Is Favored

For these reasons and due also to the fact that alternating current lends itself conveniently to distribution, mine managers and engineers strongly favor the three-phase current for all purposes about the mine. Motors utilizing this form of energy are made in two forms, what are called the squirrel-cage and the wound-rotor motors.

With the squirrel-cage rotor machine everything tending to cause sparking is eliminated. The rotor, or moving element, resembles a squirrel cage. It is a skeleton barrel of copper staves joined at either end by a copper ring. These staves are, of course, embedded in slots provided therefor in an iron core. A skeleton squirrel

*Bath, England.

cage without the iron core is shown in Fig. 2. The core above mentioned is common to the continuous-current armature and to the rotor of all three-phase alternating-current motors.

The squirrel-cage rotor possesses many advantages over other types, but, unfortunately, it has one serious drawback. The starting torque is so low that it cannot be made to move a coal-cutting machine from rest when fully loaded. In one form of squirrel-cage rotor, this difficulty is overcome by making the bars of a material

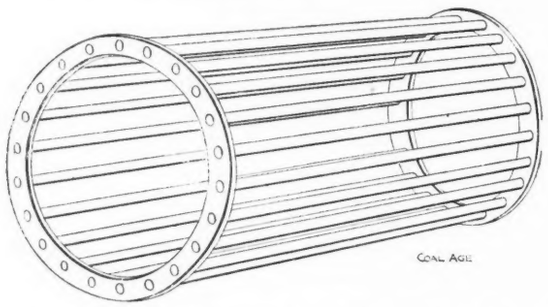


FIG. 2. SKELETON SQUIRREL CAGE WITHOUT IRON CORE

having a comparatively high electrical resistance, such as german silver. With a high electrical resistance the motor will develop a considerably larger torque on starting. Thus equipped, however, the machine is comparatively inefficient, necessitating a larger motor for a given machine, also a larger demand for current from the distribution system.

MOST MINES USE 3000 VOLTS

A large number of mines in the United Kingdom are supplied with three-phase alternating current at a potential of 3000 volts. In a few cases, 6000 volts are employed and transmitted to a point in the neighborhood of the individual mine. For coal-cutting service this current is transformed to 500 volts by stationary transformers and three-phase motors are employed at the above voltage at the coal face. Where continuous-current motors are used, the same potential is employed, and where the mine is supplied with alternating current, direct current is furnished by motor-generator sets or rotary converters in the ordinary manner.

Where alternating current is employed for driving

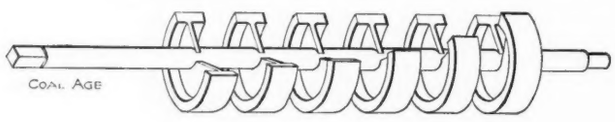


FIG. 3. CONTROLLER DRUM

coal-cutting machines, the wound-rotor motor has found most favor. This type of motor can be made to develop whatever torque may be required at starting, and the coal-cutting machine driven by it can start from rest under full load and cut its way into or out of the coal with as great ease as the continuous-current machine.

Both alternating- and continuous-current motors run at fairly high speeds, say from 500 r.p.m. upward, and the higher the speed, the smaller may be the motor for a given power. The bar type of coal-cutting machine has the advantage over the disk and chain varieties in that it runs at a much higher speed, say from 300 to 500 r.p.m., as against 20 to 70 r.p.m. in the other types. Consequently, a much smaller reduction is required between the motor shaft and cutting apparatus in the bar type of machine. With any form of coal cutter, however, some kind of reducing mechanism is required, and with the bar and chain machines, gearing is also necessary to drive the haulage drum by means of which the machine pulls itself along the working face.

This gearing is frequently the source of trouble, owing to the teeth clogging with the dust made by the machine. Cutting in the coal has the advantage, as coal dust does not appear to injure the gearing, while clay or bone dust does. Spur gearing is principally employed with beveled gears wherever necessary. Worm gearing has, however, been introduced to a limited extent.

STARTING APPARATUS A DISADVANTAGE

Both continuous-current and three-phase alternating-current wound-rotor motors have two serious disadvantages when employed to drive coal-cutting machines. Both require special starting switches and resistances, and in

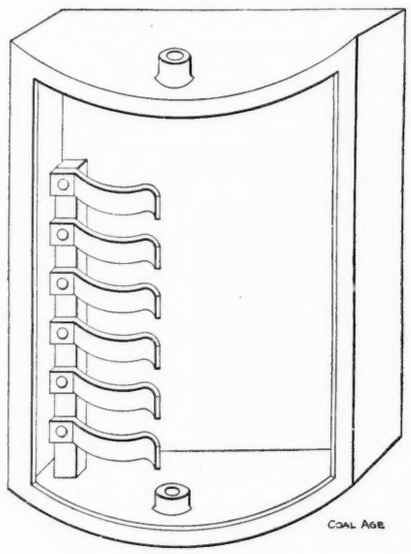


FIG. 4. CONTROLLER CASE AND CONTACT FINGERS

the space available in coal-cutting machines for accessories, these may be a source of trouble. With the continuous-current motor, full line voltage should not traverse the machine upon starting. Should such a potential be delivered to the machine, it is probable that the insulation of its coils would be seriously damaged.

The operation of the continuous-current motor depends upon its generating a reverse potential as the armature revolves. This cannot be done at starting under the conditions ruling if full-line voltage is delivered to the brushes. Consequently, some form of resistance must be interposed between the supply and the motor terminals. Also some form of switch must be employed which will cut in the whole resistance at starting, gradually diminishing it as the armature gets up speed.

With the wound-rotor motor a somewhat similar arrangement has to be made. Upon starting, a resistance must be inserted in each of the three circuits of the motor, the switch provided therefor being arranged so as to gradually cut out this resistance as the machine speeds up, completely short-circuiting the rotor coil when normal speed is attained.

The weak points in both these pieces of apparatus are the switch contacts and the resistance. The switch contacts may cause sparking as they move from one section to another, while there is always the danger of overheating or the failure of a junction causing sparking there. These dangers which exist under all conditions of motor service are particularly pernicious in the case of coal-cutting machines, on account of the small space available and the possibility of the presence of coal dust.

The form of switch which has been evolved for use with either continuous- or alternating-current motors is a modification of the well known street-car controller. In the case of coal-cutting machines, this is known as the drum type of switch. In this controller a drum of insulating material upon which are mounted segments of

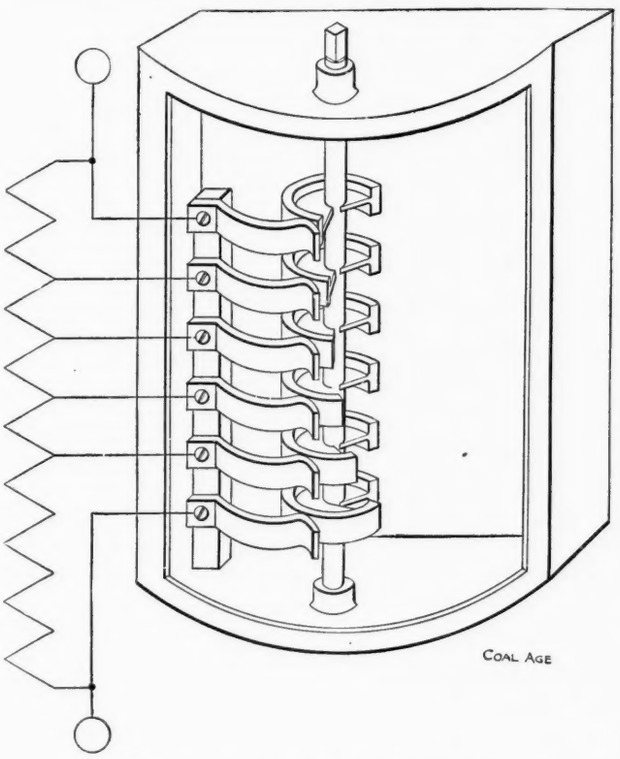


FIG. 5. ASSEMBLED CONTROLLER

brass or copper, one below the other, each subtending a different angle at the center of the drum, is mounted within a suitable case. Attached to the inside of the case are a number of springs carrying brass fingers, which made contact with the segments of the drum, as shown in Figs. 3, 4 and 5. Connections are so made in this apparatus that when the drum is revolved by means of the operating handle outside of the casing, full resistance is thrown across the terminals of the motor, this being gradually diminished until in the final position the whole of the resistance is cut out and in the case of the alternating-current machines, the coils short-circuited.

DRUM CONTROLLER IS MOST ADVANTAGEOUS

The drum controller has many advantages. It can be placed in a small space and possesses rubbing contact. The fingers and segments slide upon each other, and thus tend to keep each other clean. Sparks pass between fingers and segments when connection between them is broken, but these may be subjected to the action of a blowout coil and the casing can be made practically air tight. The adoption of the drum switch and of the grid form of resistance, both of which ideas came to the United Kingdom from America originally, has apparently solved the problem of operating electric coal-cutting machines so far as the control of the resistance is concerned.

In the grid form of resistance the metal is stamped or cast in a zigzag form, as shown in Fig. 6, a certain number of grids equaling a predetermined resistance, there being a minimum of joints. This form of resistance also dissipates the small quantity of heat liberated during the starting period. This is a decided advantage over the old continuous-wire form of resistance.

The connection between the current-supply wire and the machine is perhaps the most troublesome problem involved in driving coal cutters electrically. In longwall workings, the coal face may range from 100 yd. up to half a mile, or even more in length. It is reached by roads protected by pack-walls leading from the haulage road. Down these "gate" roads, temporary supply wires are led to the neighborhood of the coal face. From here, what is termed a "trailing" cable carries the current to the machine.

THE GREATEST DIFFICULTY IS WITH THE TRAILING CABLE

Although the temporary wires along the road require considerable attention, since they are subject to falls, the main difficulty arises with the trailing cable. Between this conductor and the wire extending down the gate road is placed a gate-end switch box. Various forms of these boxes have been developed during the past 10 or 15 years, all of which were designed to not only prevent the machine operators from getting shocks but also to prevent explosions in the box itself. Figure 7 is a diagrammatic sketch of a typical gate-end box for three-phase service. It is made of cast iron with a hinged cover, and wide, carefully machined surfaces where the different parts of the box join.

The box is divided into two main compartments, one for the switches and the other for the fuses, one switch and one fuse being supplied for each phase of the current. Horizontally, also, the box is separated into six compartments, one for each switch and each fuse. The three switches are operated simultaneously by a handle on the outside, and the box cannot be opened until the switches have first been opened. Thus, when changing a fuse there is no danger of shock.

The trailing cable connects to the box by a plug which has four contacts, three for the three-phase conductors, and one for the ground wire. The three-conductor armored cable passes through a gas-tight gland, the armor being connected to the body of the box, to which the ground wire of the trailing cable is also connected. Where unarmored cables are used, a ground wire is led to a terminal in the gate-end box, to which the ground wire from the trailing cable also makes connection.

For continuous-current work, the same arrangement is followed. There are, however, only two switches and two fuses instead of three.

It is now usual for the trailing cable in three-phase work to consist of four conductors, and in continuous-current work, three conductors. The third conductor with continuous current and the fourth with alternating is the ground wire.

Throughout the United Kingdom, there has been a considerable controversy over the question of armored versus unarmored cables, and it has been decreed by the Home Office that armored cables shall be used in the majority of cases. The armor must be connected to ground at the bottom of the pit and also at the top. Furthermore, this armor must be maintained continuous. It has been decreed also that the armor shall be of sufficient electrical conductivity to carry any leakage current that may arise. This maintains the electrical potential along the outside of the cable as well as that of anything which the covering touches at zero, that is, the entire cable surface is grounded. In order to insure metallic continuity in the armor, joint boxes are employed. These bridge over the break in the armor at splices in the cable and protect them from dampness and mechanical injury. At the face, the ground wire is connected to the body of the gate-end box and to the frame of the machine. This is to avoid accident due to the machine being ungrounded. In several instances, the man who follows the machine, manipulating the haulage or guide rope, has been fatally shocked by it, owing to the whole of the machine being alive. By connecting the armor of the supply cable to the frame of the machine, the latter and all parts connected thereto, such as the haulage rope, are reduced to a zero potential, and the operator should be able to handle the haulage, or traction rope, or any other

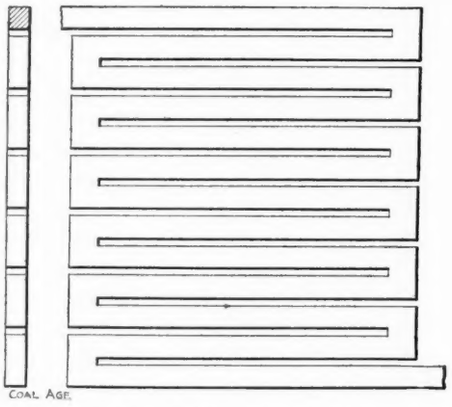


FIG. 6. A RESISTANCE GRID

portion of the apparatus, except the brushes, in the case of a continuous current machine, or the equivalent parts of the alternating motor with perfect safety.

DIFFICULTIES ENCOUNTERED IN MAINTAINING THE INSULATION

Two serious difficulties have in the past arisen in the matter of maintaining the insulation of the trailing cable in a sufficiently perfect condition to protect the workman handling the coal-cutting machine from shock, also the insulation of the conductors as they pass into the machine. This trailing cable, of course, follows the machine along the face. It lies upon the floor and is subject to all the rough handling incident to proximity to actual mining operations. Lumps of coal and rock, iron tools, etc., fall upon it; the men walk on it, and the like. Various methods have been employed to overcome this difficulty, but apparently without success until recently.

A method of insulation which has met with considerable success in the United Kingdom is by covering the three- or four-conductor cable, as the case may be, with an outside envelope of a special quality of rubber. It was discovered by accident, as usual, that the rather low grade of this material employed for sheathing cab tires possesses important properties. It has considerable mechanical strength, resists oil, dampness, acid, fumes and almost all other ills to which trailing cables are subject. It is easily repaired in the factory when injured, and it is, of course, a simple matter to keep a spare cable on hand.

All the leading British cable makers are now turning out trailing cables covered with what is known as cab-

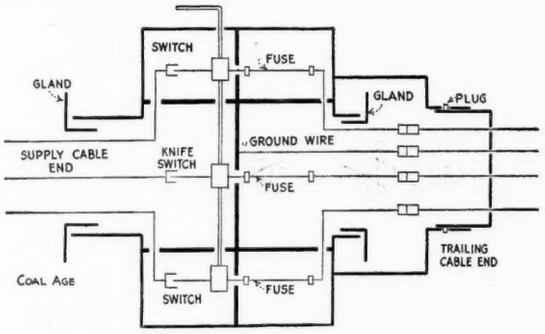


FIG. 7. DIAGRAM OF A GATE-END BOX

tire sheathing. This appears to have surmounted the difficulty of injury to the trailing cable.

The difficulty of insulating the conductors as they traverse the inner portion of the machine and of protecting the metallic switch, etc., has been met by a liberal use of mica and improved methods in working the same. Mica tubes are now employed, consisting of thin sheets rolled upon a mandrel and tied in place until they are slipped into the position which they are to occupy, usually holes in castings. In this form, it is necessary to hold the mica in place after it has been rolled or it would expand and fly open.

In this connection, it has also been discovered that there is mica and mica; furthermore, that micanite, which is used for many purposes in connection with the manufacture of electrical apparatus, will not answer where high voltages are employed, or where mechanical strength is required. Mica varies decidedly in its qualities, and if a poor insulation of this kind is employed, it has a pernicious tendency to break down, allowing the very connection to be made which it was intended especially to prevent, resulting in trouble, delay and danger.

All rescue apparatus should be maintained in an effective condition. It should be under the charge of a skilled man. Periodic overhauling should be insisted upon. The men who form the rescue corps should be carefully trained under conditions as nearly similar to those of the mine as can be reproduced.

The advantages of packing in longwall mining are: (1) A greater degree of safety, as roof falls are fewer. (2) There are no places in which gas can accumulate. (3) Absence of coal dust, most of it being behind the packing. (4) Reduction of the cost of timbering, as props can be withdrawn before the pack is built up and reset over and over again. (5) Increased output from the same length of working face. (6) Fewer men required. (7) A more rapid advance. (8) Roof and main roadways in much better condition. (9) Fewer cross-roads are required. (10) Less surface damage, due to caves.

Chart for Coal Purchasers

By W. V. Bowles

Although coal is bought for evaporating water, few buy it on an evaporative basis. The reason usually given is that the human element or "error" cannot be accounted or compensated for. Most engineers agree that the evaporative basis is the correct one on which to buy coal.

Assume a plant which requires, say, 3000 or more tons of coal a year, and it is desired to purchase coal on an evaporative basis. The first thing to do is to run a test on the boilers with various coals and make a chart from the records obtained. The accompanying chart is plotted from a stoker plant and illustrates the idea and plan of procedure.

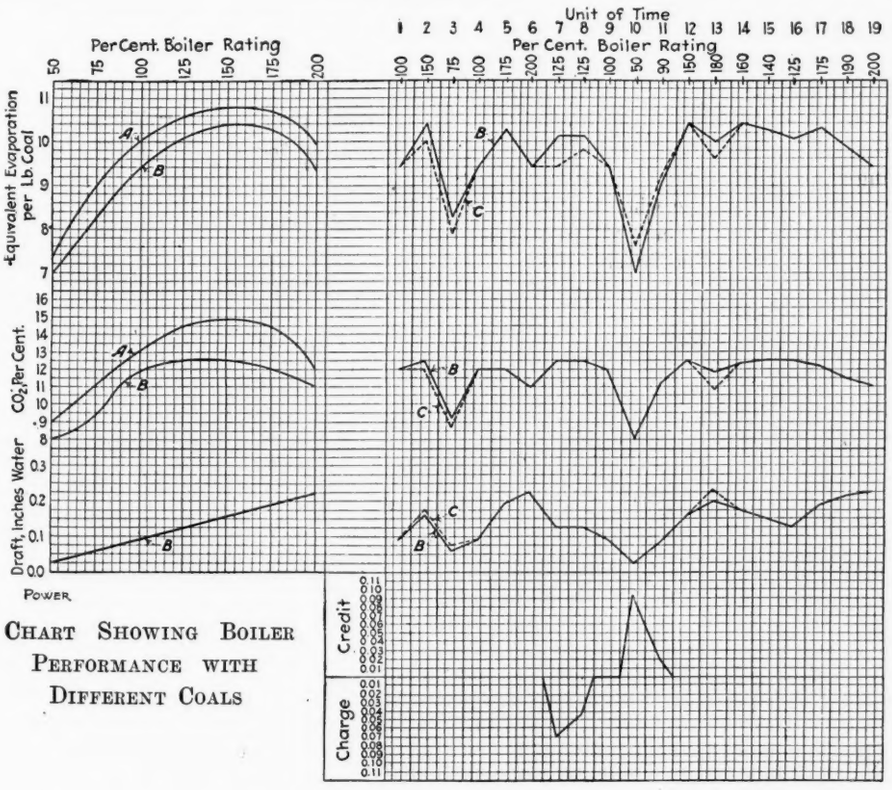


Chart Showing Boiler Performance with Different Coals

It is understood that the coal company should have a competent representative present during the test and at the calibration of all instruments and to have access to all records. First, the attainable evaporation and CO_2 curves are plotted at all boiler loads, together with a curve showing the best draft to use. Below is plotted a curve showing what is in the plant, termed "the adopted standard." This is based on a longer test when uncontrollable conditions may be taken into account.

The chart is also divided into a number of time periods, hours or days, as may be found most suitable. As each period is ended the average boiler rating is marked at the top, and below is plotted the adopted standard.

Referring to the charts under period 2, it is found that the average rating was 150 per cent. The equivalent evaporation should be 10.4 lb. per pound of coal, but the actual evaporation fell off to 10 lb. Following down the column, may be found the reason. The CO_2 dropped from 12½ to 12 per cent. Following still further down the column, the draft has increased from 0.16 to 0.175 in., showing the operating force to be at fault. A similar condition is indicated in the next column.

Under period 7 the evaporation dropped 0.069 per cent., but the operating conditions were according to adopted standards, when the coal company is penalized an equivalent of 0.069 on the coal burned during that period. If a better evaporation is gained than is shown by the standard line, as in period 10, the coal company is given a bonus equal to the increase; in this case, 0.092 per cent. If a shipment of bad coal comes in and the operating conditions are allowed to deviate from the standard, both will be shown in their correct proportion.

It may be found desirable to add draft lines to show conditions in other passes of the boiler, also temperature curves from the various passes. With proper checks on drafts, temperatures and CO_2, the human element can be accurately checked and accounted for; so there appears no good reason why the human element should control or influence the purchase of coal on an evaporative basis.

Such a chart should be an excellent thing to carry along from day to day for the benefit of the plant, even though it is not intended to buy fuel on this basis, for it will show the value of the firemen in dollars and cents.

Like all other kinds of record keeping these charts require much time to be made out. But in plants large enough to warrant checking of performances of apparatus a clerk is available who can plot curves from the tabular matter given him. Cross-section paper may be purchased that will fit nicely into large loose-leaf book covers.

COLLIERY NOTES

In rebonding old tracks, it is often advisable to use exposed bonds, since if the splice bars are removed from the old rails, the bolts frequently have to be cut, and it is often impossible to successfully draw the plates back into their original space.

An English authority has pointed out that most of the coal used in England for steam raising purposes is purchased in an unscientific manner. He suggests that if the coal was bought on rational lines, a saving of from 7 to 10% could be effected. This authority calls particular attention to the importance of the ash contents in coal. He stated that if the ash has a low melting point, the bars always become choked. The presence of sulphur generally results in the corrosion of furnace bars, boiler tubes and economizer tubes. This action is much more pronounced if steam jets are used under the furnace. The final suggestion was that all coal contracts should be arranged on a sliding scale basis, and payments should be made according to the heating value, a certain standard being fixed and a greater or less price should be paid according as the quality of the coal rose or fell from this fixed standard.

The Labor Situation

SYNOPSIS—The arbitration scheme in eastern Ohio is halted. The sale of the Bache-Denman property to the Union may not be consummated. A strike occurs in West Virginia against a change in the basis of payment, though the contract gives the operator freedom of choice.

After all, the miners' officials did not agree to arbitrate the eastern Ohio strike, and there is still a deadlock. The joint conference continued at the New Hollenden, Cleveland, during the greater part of last week without any tangible result. C. J. Albasin, the district president, is said to have been hopeful of a settlement, but what he hoped might happen is hard to understand.

What the Miners Wanted

The operators were ready to arbitrate and even agreed to make the scale of the arbitrators retroactive, so that it would apply from the time the men went to work. But the miners wanted 47c. per ton, at once, as the price of machine-mined run-of-mine coal, and they proposed that there be five arbitrators, two appointed by the miners, two by the operators and one by the other four.

They did not want a retroactive scale, but wanted the arbitration board to fix a date when their labors were completed. Thus by deadlocking on the selection of a fifth arbitrator, and perhaps by later delays, they could secure for themselves the 47c. rate for a long period of time.

If the operators declared that they could not pay so much and closed down, the cry of bad faith would be raised. If they stood the loss, it would be clear to everyone that they could afford to stand it indefinitely. The operators desire to pay 58c. for lump and 22c. for slack coal till the award is made.

The conferences adjourned on Friday, Feb. 5, to meet again on Monday, Feb. 8. Meantime, in deference to the investigators, nothing has been done to reopen the mines under "open-shop" rules.

The Ohio Legislature May Act

There was an informal meeting of the members of the mining and labor committees of both houses of the Ohio General Assembly to discuss the feasibility of starting an investigation into the labor situation in eastern Ohio. Many of the members of these committees were opposed to suggesting such an investigation on their own initiative, and it was practically decided to steer clear of the proposition at this time. Perhaps the legislature will be called upon by the presentation of a resolution or bill to make the investigation later, and it can then be taken up.

Representative Tetlow, of Columbiana County, has prepared a resolution which will be introduced in the General Assembly, providing for a thorough investigation of freight rates for coal shipments. It has often been charged that the present rates discriminate against Ohio operators, and it is believed the question can be settled once for all by the investigation. The resolution has the support of both operators and miners.

The Glens Run Coal Co. is asking to have its eviction orders dismissed, and no one is being evicted from company houses. The miners are comforted by this and by the fact that they are now assured that the shoes supplied them by the union may be worn by them and their families. C. J. Albasin says they are practically a gift from a school in Newark, and that permission to accept them had been granted by Charles Baine, the secretary of the International Boot and Shoemakers Union at Boston, Mass. A rumor has arisen that miners, driven out of Arizona by a smallpox epidemic, are to be brought to Ohio to work in the mines.

A Run-of-Mine Controversy in West Virginia

There is a strike at the Ronda mine of the Coalburg Collieries Co. on Cabin Creek in West Virginia. It appears that the mine has been run on a run-of-mine basis. The operators desire to avail themselves of a clause in the contract, permitting them to place their schedule on a screened-coal basis. The miners quote Clause 10 in the contract, which states:

> The mining rate per ton for splint or hard coal covered by this agreement is fixed upon a run-of-mine basis; screen lump coal may be mined and paid for on a lump basis, on a basis of 30 per cent. nut and slack over a 1½-in. screen.

The miners claim they are breaking the coal so fine that 35 per cent. of slack is made and therefore that the operators have no right to change the schedule to a basis framed on 30 per cent. of slack. But Clause 10 seems to make it clear that the change can be made at the option of the operator. It is said that the Dry Branch mine is also to be run on the screened-coal basis.

The rate proposed is 43c. per ton for the lump coal, and this, figuring on 30 per cent. of slack, is somewhat better than the present price for run-of-mine, which is 30c. per ton. The difference in favor of the miners is a cent on every 10 tons, if no more than 30 per cent. of slack is made as provided. D. C. Kennedy, the operators' commissioner, has been in Florida. The commissioner for the miners is John King. It is believed that the commissioners will decide that the company is well within its contracted right.

The Union May Not Buy the Bache-Denman Mines

The sale of the Bache-Denman properties in Arkansas to the United Mine Workers of America is said to have failed, but the statement has been denied. The Sebastian County Coal & Mining Co. is owner of much of the coal and the Union anticipated that these royalty holders would be well pleased to replace two tipples which union violence had destroyed. They should, of course, rebuild as often as the mob sees fit to destroy them.

Possum Hunters Menace Western Kentucky

The activities of the "possum hunters" in the western Kentucky coal field have subsided noticeably in the past two months. This change of conditions is attributed partly to the extreme weather conditions which have prevailed and partly to adverse public sentiment. While the mine operators are still pursuing their policy of vigilance, the county sheriffs have done much to relieve the tension by putting deputies on duty in the districts where the "possum hunters" have been most active.

At the recent session of the Circuit Court at Greenville, in Muhlenburg County, the judge granted the Commonwealth attorney's petition for a change of venue. Indictments against alleged "possum hunters" will thus be tried before juries in remote communities.

The Butler County Circuit Court, in session at Morgantown, convened Feb. 1. Judge McKensie Moss, of Bowling Green, delivered a vigorous charge to the grand jury, in which he urged a rigid investigation of the outrages alleged to have been committed by the "possum hunters." For many weeks the citizens and mine officials have been kept in a state of alarm by the periodical raids. A coal-mine tipple at Island Station was burned and many men and women have suffered whippings at the hands of these night-riding bands. Not only have these latter defied the law themselves, but they have threatened those who sought to interfere.

Despite Intimidation, Testimony Is Obtained

One farmer in Butler County was warned not to testify before the grand jury in Morgantown. Nevertheless, he appeared before the jury and told all he knew of the depredations. Under his arm he carried a gun loaded with buckshot.

Judge Moss said he would continue the court for two weeks if necessary to bring to justice the guilty parties.

The Hopkins Circuit Court now in session in Madisonville is likewise probing the "possum-hunter" outrages. Johnson Williams, who, while actually acting as guard for the Kington Coal Co., was whipped by the "possum hunters," was indicted by the grand jury for carrying concealed weapons. He was acquitted, however, when the necessity for his personal protection was established by the defendant's attorney.

The Carbondale Coal Co. resumed operation during the past week after a suspension of over two months. "Possum-hunter" raids caused such a general and constant alarm in this company's camp that a shutdown was necessary. Sixty-five negroes have been imported during the past few days from the neighboring camps, and, with the assistance of the county sheriff, the Carbondale concern feels that no further trouble is in store for it.

The Aftermath of the Colorado Strike

One hundred and fifty indictments for murder, arson, assault and rioting have been found by the grand jury in Colorado. Among those arrested are Eli M. Gross, state superintendent of free employment bureaus and vice-president of the State Federation of Labor; William T. Hickey, secretary-treasurer of that federation, and Charles Haines, secretary of the United Mine Workers at Walsenburg, Colo. Judge C. C. Butler, of Denver, Colo., will try the cases at the call of Judge A. W. McHendrie, of the third judicial district.

Electrical Development in 1914

By F. R. Davis*

SYNOPSIS—Refinement of design and an increased size of the units employed were the most noticeable characteristics of the year's progress. The demand for storage-battery and combination locomotives is increasing.

While some unique developments characterized the progress in the electrical industry during 1914, the general advance has consisted largely of improvements in apparatus that had already attained relatively high efficiencies, both electrically and mechanically.

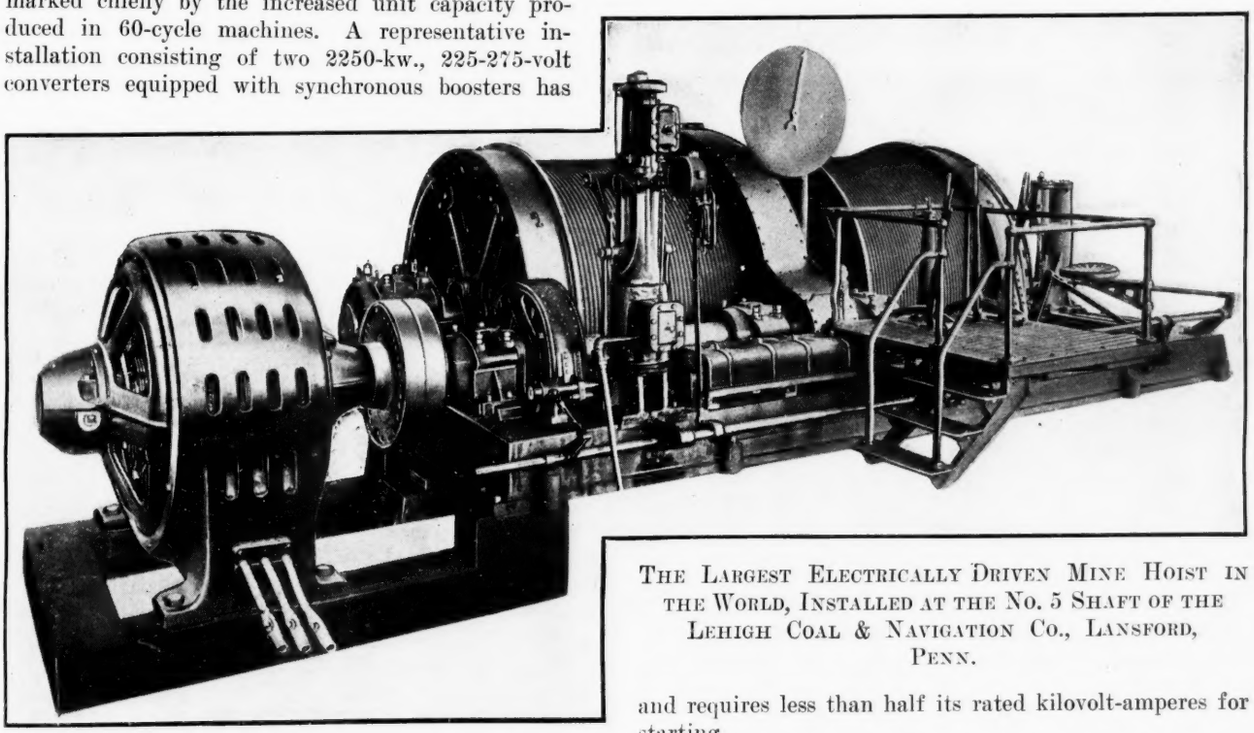
The essential features of the achievements attained embrace a marked refinement in design resulting in increased efficiencies for many classes of apparatus, economical concentration of large energy values in single machines, and a broadening of the field of application based on experiment and analysis of exhaustive operating data.

The advance in synchronous converters has been marked chiefly by the increased unit capacity produced in 60-cycle machines. A representative installation consisting of two 2250-kw., 225-275-volt converters equipped with synchronous boosters has been constructed for the Boston Edison Co. These machines have approximately 50 per cent. greater capacity than any 60-cycle machines of this type heretofore developed, and their successful operation has resulted in the adoption of still larger units.

The equipment of synchronous converters with synchronous boosters, which are integral parts of the complete machine, together with the arrangement of wattmeter control, constitutes a most important improvement in synchronous converter operation and insures a positive and automatic adjustment of the direct-current voltage. This is accomplished through control of the field excitation of synchronous converters provided with commutating poles. It insures correct excitation at all loads and voltages instead of a step-by-step correction, which has heretofore been necessary. The new system obviates the use of contactors in combination with a number of resistance steps, which were formerly required, and has been applied with entire success during the year to both 25- and 60-cycle units of the synchronous booster type.

A horizontal-shaft 6000-kv.-a., 50-cycle, 500-r.p.m. synchronous condenser constructed for the Southern California Edison Co., of Los Angeles, is of unusual interest, due to the fact that it was designed for operation on a 16,500-volt line, no machines of this type having been previously built for potentials exceeding 6600 volts.

In addition to the precautions necessary for insulation against this unusual potential, special efforts were made in designing the machine to minimize the losses; and as a result, there was produced a synchronous condenser of very high efficiency, utilized solely for power-factor correction. It is self-starting by means of a compensator and requires less than half its rated kilovolt-amperes for starting.



The Largest Electrically Driven Mine Hoist in the World, Installed at the No. 5 Shaft of the Lehigh Coal & Navigation Co., Lansford, Penn.

Prior to 1914, the largest core type of transformers as produced by the General Electric Co. did not exceed 2000 kv.-a. in rated capacity, but during the year the maximum rating was carried up to 7500 kv.-a. The maximum rating of single-phase water-cooled, shell-type transformers was also increased by the construction of four units of 8333 kv.-a. capacity.

There has been a marked reduction in interruption to service in transformers of recent design, as they are now capable of withstanding momentary short-circuits under sustained primary voltage without injury to the coils. This has been accomplished largely through changes in the grouping of the coils and working to higher inherent reactance.

*General Electric Co., Schenectady, N. Y.

A feature of unusual interest for the year is the development of a combination transformer which may be operated either self-cooled or water-cooled. It may be designed for normal operation with water circulated through the cooling coils, in which case, it may also be safely operated at 50 per cent. of normal load without the circulation of water and without exceeding its specified temperature rise.

On the other hand, this transformer may be designed for normal operation as a self-cooled unit, and be provided with the necessary cooling coils, which, when utilized, permit operating efficiently at 50 per cent. above the normal capacity.

The economical advantages of such transformers are obvious, especially for localities where the purchasing rate of water is high and the transformer is fully loaded only part of the time. This design also provides a factor of safety in case of interruption in the water supply, in which event the apparatus may still be operated at partial load instead of being shut down.

With the steady growth in the size of power plants and distribution systems, there has arisen among operators a fuller conception of the practical value of providing ample protective equipment, such as voltage-reducing devices for cutting down the station voltage under short-circuit conditions, arcing ground suppressors for short-circuiting arcs caused by grounded phases on delta connected transmission systems, and the recently developed and improved current-limiting reactances. A fuller appreciation of such devices is amply attested by a continual increase in the number of propositions for power-station equipment including this class of apparatus.

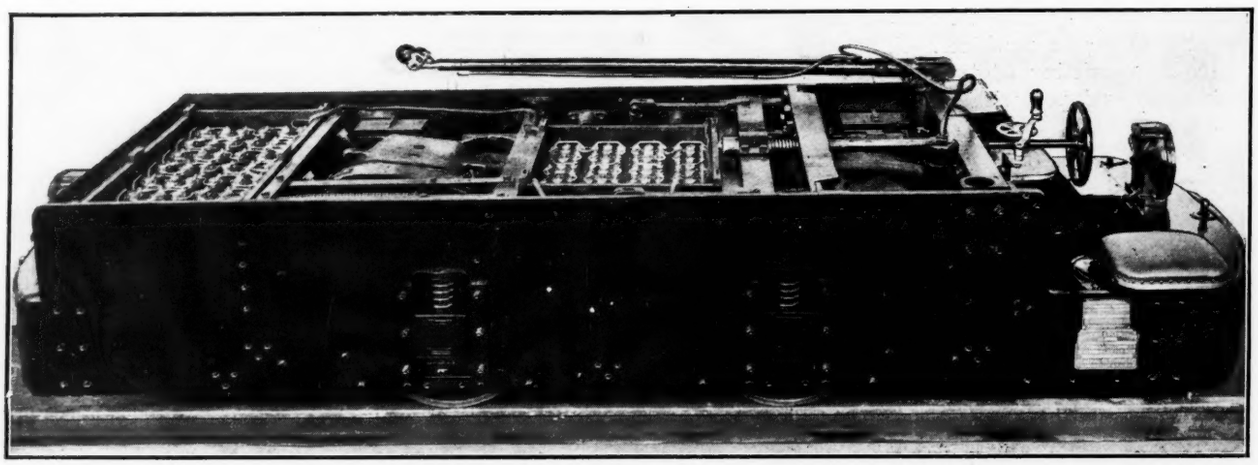
Reactances have been improved to a considerable extent during the past year, and the changes made have been based largely on the experience gained in numerous applications of the earlier types utilized for the protection of feeder lines. In order to facilitate calculations on the equipment necessary to meet the requirements of power systems having widely varying operating conditions and capacities, these reactances are now made in three distinct forms.

Commutating Poles and Ball Bearings Are Standard

All of the mine locomotives manufactured by the General Electric Co. in 1914 were provided with commutating pole motors and ball bearings as standard equipment, and the operating records of those placed in service during the year show that these improvements have reduced the number of interruptions to service and have resulted in decreased maintenance costs.

The increasing output of many mines has rendered it necessary to equip them with locomotives of relatively large capacity, capable of handling heavy trips over steep grades and long hauls. For this class of service there have been built a number of three-motor, 15- and 20-ton locomotives. The 20-ton unit combines some unusual features in design and construction. The body is made of rolled steel, each side frame being cut from a solid rolled-steel slab, while similar material in conjunction with steel channels is used for the end frames. The three driving motors are each rated at 85 hp., and are of the split-frame type. These particular locomotives were built for 42-in. gage, but the same construction and capacity can be utilized for a minimum of 36-in. gage.

There has been a definite increased demand for the storage-battery type of locomotive for gathering work, as it has been demonstrated that in this service each machine will effectively displace two or three mules. Heavy units are not, as a rule, required, and the locomotives of this class so far provided have been rated at from 3 to 7 tons. Most of these are of the straight storage-battery type; but a limited number have, in addition, been equipped so that they can operate from a trolley wire when in the main headings of a mine.



Combination Trolley and Storage-Battery Locomotive

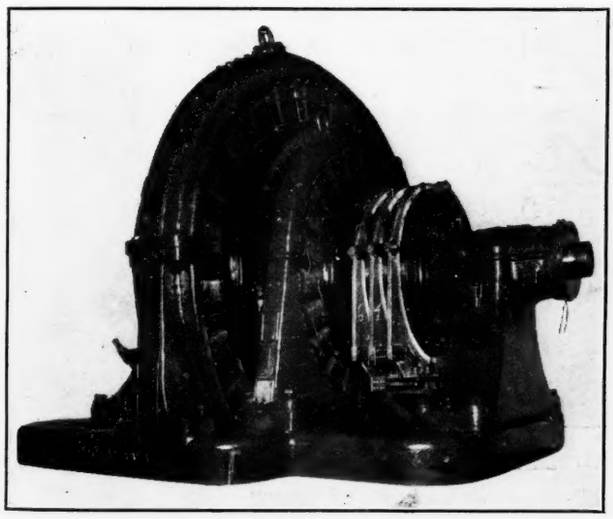
The advantages of this arrangement are obvious in that by means of a small self-contained motor-generator set, the battery may be automatically charged while the locomotive is running on the trolley. When the locomotive is working in the rooms, gathering the cars, a varying percentage of the battery charge will be consumed; but as soon as the machine is again operated on the trolley, these losses are automatically compensated.

With this dual system of operation, the battery need never be entirely discharged; and if space limitations are severe, it permits the use of a smaller battery than would otherwise be necessary. A representative machine of this type has been in operation in a West Virginia mine for a period of about four months. It runs on a 42-in. gage track and its overall height does not exceed 30 in.

The largest induction-motor, shaft-hoist equipment in America was placed in operation in November, 1914, at Lansford, Penn., for the Lehigh Coal & Navigation Co. The driving motor is rated at 750 hp., 300 r.p.m., using three-phase, 25-cycle current while the drive is through a single reduction gear.

Positive control of the hoisting speed is secured by means of an improved type of liquid rheostat and high-tension air-break contactors, the motor circuit being 2300 volts. This hoist serves a 600-ft. vertical shaft, hoisting 11,500 lb. per trip at the rate of 90 trips per hour with a maximum rope speed of approximately 1600 ft. per minute.

The liquid rheostat referred to above was developed primarily for mine-hoist service and insures safe operation at quick reversal. It employs two sets of fixed electrodes at different elevations. One set is widely spaced, while the other has large electrode areas and small spacing in order to obtain a very low final slip. The two sets of electrodes are connected in parallel after the electrolyte has reached a certain level corresponding to a predetermined decrease in rotor voltage. All parts of the rheostat itself are stationary, thus insuring absolute reliability. The electrolyte level is varied through the operation of a movable weir and a small motor-driven pump.



A Synchronous Converter with Revolving-Armature Synchronous Booster

The Small Substation

There are numerous localities remote from low-voltage distribution, but accessible to high-voltage transmission lines, where the small rural substation can be economically utilized for the distribution of electrical energy in capacities as low as 3 kv.-a. Under proper conditions, a market of this kind offers the operating company a sound financial basis for service, providing that the equipment can be installed at a reasonable price and can be depended upon to operate with low maintenance expense. The great extent of the field for this class of electrical equipment is indicated by numerous successful substations for small towns, farms, mines and quarries, pumping outfits, small isolated manufacturing plants and various contracting and construction jobs.

Experience has shown that, to avoid interruptions to service, the equipment supplied to meet the operating conditions indicated must be proof against damage from the weather, and, in order to provide this protection, all operating parts of switching apparatus which are liable to rust should be subjected to special treatment.

While considerable work had been done in the effective equipment of rural substations prior to 1914, the activities of the past year have been along the line of standardizing apparatus suitable for use in connection with various transmission voltages and in improving or redesigning standard apparatus previously utilized.

The complete standardized line now available has proved reliable in service and is designed to minimize danger to the equipment in case of disturbance on the main line; and, while it is proof against injury to itself or other apparatus, it does not require skilled attendance. Furthermore, it is largely semiportable, so that it can be installed or removed promptly and economically, and the fact that the entire line has been standardized permits an accurate predetermination of the cost of a rural substation when the operating conditions and service requirements are known. It also makes it possible to secure for the small community many of the economies inherent in high-tension transmission.

The vast number and varied character of the developments in the modern electrical industries render it exceedingly difficult to give in limited space comprehensive description of the progress made in any year. In this reference to a limited number of specific examples, it may be reiterated that most of the apparatus and devices cited, all of which were built by the General Electric Co., have already been subjected to the stresses of commercial service and have successfully withstood operating tests.

Extracts from a Superintendent's Diary

I bought a ten volume Encyclopedia of History today from a young lady book agent; I did not particularly need the books but the young lady so evidently needed money and encouragement that I could not resist the appeal.

This is not the first time that sympathy has made for an increase in the size of my library; in fact many of my books have been added for somewhat similar reasons.

It naturally follows that there are some books in my library that are seldom opened, but they are far from useless, nevertheless.

Ofttimes I go to my library in search of peace and quiet after a day of worries and weariness, and when I open the bookcase I have no idea as to the volume that I shall choose; it is at such times that a book with a history, quite independent of the matter between its covers, is liable to attract my attention and almost before I am aware of it, a complete picture from the past is flashed on my mind and I wander off in reverie.

I have two books in particular whose bindings seem to possess almost hypnotic power over my imagination. One is a book of precepts published by a clergyman more than a century ago. It was given to me by an old lady who has long since passed away. To my shame, I must admit that I have never read one-third of its contents, but all of the events of that lady's life, the circumstances that led up to the presentation, the heart-to-heart talk that accompanied it, and her interpretation of the precepts, all these are written on the back of that book as legibly as are the printed lines within its covers.

In some mysterious manner this dear old lady has accomplished, as concerns me at least, a task that only the greatest of authors are able to accomplish; she left behind a living, breathing message.

The other book came into my possession as a reward for a charitable act.

It was also written over a century ago and was brought into our camp by an old man, a dissipated wretch who before his death had disposed of all his earthly posessions to satisfy his craving for drink, with the exception of it and an old miniature of rare beauty. His affection for the book and miniature was explained after his death.

Because I paid the burial expenses, the proprietor of our camp's boarding house insisted that I should take the book and miniature.

Out of curiosity I read the book, and from marginal notes, I soon discovered that the last owner was a grandson of the author of the book, and the miniature was a likeness of his grandmother. The marginal notes made by the grandson show that he inherited the wanderlust from the grandfather, but the grandfather's genius did not accompany it. He had talent enough, however, to make his grandfather live again for me in the book which I now own through criticisms and remarks scrawled along the margins of the pages.

All of which leads me to believe that book knowledge is not an absolute necessity to insure the selection of a library that may bring joy and comfort to its owner. And I find much satisfaction in that conviction when my friends take a fling at the titles I have accumulated.

I started out with well defined ideas about the kind of library I wanted, but as with all well laid plans, I find unaccountable impulses have been responsible for most of the decisions; in appraising the library that has resulted, I cannot see where I should like to make any changes.

Saving on Your Coal Bill

Dr. William Thomas, the efficiency expert, has recently drawn attention to the fact that in every dollar's worth of coal, a considerable saving may be effected by observing a few common-sense rules.

Whether you use a kitchen range, a hot-air furnace, a steam heater, an open grate or what not, it is the saving in waste which counts for most. After all, it is a matter of surface extent which figures in waste and coal consumption.

For each quarter of an inch of soot and fine ashes on a furnace, your coal loses 80 per cent. of its heating efficiency. For each sixteenth of an inch of soot on the inside of your stove, your coal used loses 25 per cent. of its heating capacity.

Plainly, then, the cue for the housewife, the janitor and even the easy-going *paterfamilias* is to clean soot away from each nook and crevice of every kind of a heater. To clean them two or three times a season is not enough. They should be cleaned every week.

Drafts require particular attention in the way of cleansing. Pipes, cracks, doors and folds in the sheet iron which goes to make up the furnace, range, or other kind of heater, should be especially looked after.

In this way one ton of coal will be made to give several times as much heat as it formerly did.

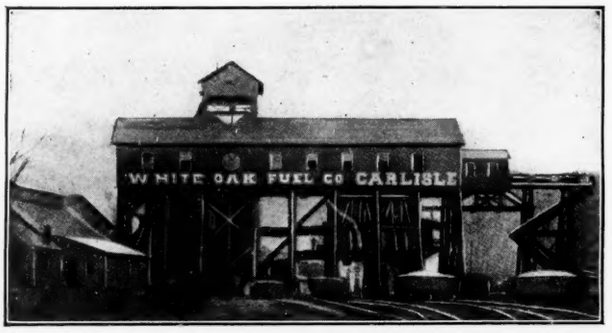
Explosion at Carlisle Mine in West Virginia

By S. A. Scott*

On Saturday, Feb. 6, at 7:40 a.m., an explosion occurred in the fifth left off the third right entry of the Carlisle mine. Because of the excellent condition of the other parts of the mine, the explosion was confined to this one entry. Bratticemen and firebosses went to the scene immediately and succeeded in saving four men who had been overcome. By 9 a.m. the superintendents and mine foremen from adjoining mines arrived and the work of rescue was started in earnest by 11 o'clock. The work of bringing out the dead was then started, being completed by 6 p.m.

Twenty men were killed and four were injured. One of these latter may yet succumb to his injuries. The mine in general was not damaged to any extent except the stoppings on the fifth left entry and the door of third right at this point. These were blown out by the force of the explosion.

At about 3 p.m. State Mine Inspector John I. Absalom arrived, his colleague, Lance B. Holliday, joining him about 5 o'clock. About 2 a.m. on Sunday the Bureau of Mines rescue car No. 8, temporarily located at Coalwood, W. Va., arrived at the mine.



Tipple at Carlisle Mine Where Recent Explosion Occurred

The work of rescue was directed by myself assisted by my assistant, T. C. Thomas, and the company's inspector, Edwards Grass. Assistance was tendered by all the companies operating the surrounding mines. It is likely that work will be resumed in about a week.

[The Carlisle mine is operated by the White Oak Fuel Co., a subsidiary of the New River Co., the post office being also Carlisle. The mine is at the head of the White Oak branch of the Chesapeake & Ohio Ry. and is located in Fayette Co. The bed operated is the "Sewell" and connection with the surface is by a shaft. The seam runs from 3 ft. 4 in. to 4 ft. 3 in., but apparently averages 4 ft. in thickness.

The last inspector's report (1912) states that the mine is gaseous, and that the roads in second and third right headings tend to get too dry and dusty and have to be kept watered down. Apparently the requisite care had been taken to keep the dust moist, for the explosion did not spread. A correspondent informs us that the disaster was caused by a door boy with an open light entering a room marked as dangerous.—Editor.]

*General manager, The New River Co., Macdonald, W. Va.

Editorials

The Net Output of Anthracite

It is to be regretted that over one-tenth of the anthracite production is consumed at the mines for heat and power, and the proportion thus utilized seems to be on the increase. If this greater consumption arose from the introduction of mining machinery we could feel that it was justified, but entirely different causes for the growing consumption per ton produced must be sought.

In 1892 the U. S. Geological Survey put the consumption at 8.3 per cent. of the total output. In 1903 it was still only 8.5 per cent. according to the then newly formed Pennsylvania Department of Mines. In 1914 it had mounted to 10.2 per cent.

During the life of that Department and the chief inspectorate of James E. Roderick the amount of water handled per year has decreased from 13 tons per ton of coal produced to 11.7 tons. This is a considerable reduction and it would seem that the decrease in volume can hardly be equaled by the increase in depth. So that the water problem cannot be, as might be thought, the cause of the increased weight of coal consumed per ton produced.

Some increases in the coal used may be due to the power required for more perfect preparation. A more important cause may be the use of inferior coals under the boilers. However, if the coal used in 1903 contained 6 per cent. of impurity—surely too low a figure—the coal used in 1913 if it gave only equal power would have to contain 21.8 per cent. This figure as an average is probably higher than an investigation would show.

Other causes for increased use of coal are more numerous haulage systems, extensions of those existing, increased hoisting depth and the replacement of drifts by shafts. Still we wonder why the anthracite region as a whole has not balanced these increased drains by a proportionate economy.

It is perhaps not possible to compare the anthracite collieries with the bituminous mines of the country, for the water to be handled in the latter is not so great nor are the mines so deep. Furthermore some few mines obtain power from coal-oven heat or gases. Yet even after admitting the difficulties of the comparison, it does seem strange that the bituminous mines, inefficient as many of the plants are, used in 1913 only 2.44 per cent. of the coal produced or roughly one-fourth as much as the anthracite collieries.

Is some of this apparent inefficiency in anthracite plants due to the use of steam lines such as we have seen installed—one, for instance, 14 in. in diameter which together with a 5-in. extension was over a mile long? Is it due to the use of cylindrical boilers, which we hope are now only reserves, but which still form 11 per cent. numerically of the whole equipment though only 3 per cent. of the horsepower capacity?

Is it due to the existence in actual use of some valuable relics in the way of steam engines for which a museum of patents like those in London and Berlin should be provided? Is it the result of excessively long haulages and unnecessarily disconnected activities?

This we do not know—certain it is that while to the anthracite region we may look without disappointment for some of the most uptodate equipment we may also find there some plants which serve only to recall the early triumphs in the long and honorable history of engineering in the anthracite region.

We append a table showing the tonnages produced, the tonnage used for steam and heat at the collieries and the percentage the latter forms of the former as calculated from the state reports:

TABLE SHOWING PROPORTION OF COAL CONSUMED FOR HEAT AND POWER AT THE ANTHRACITE PLANTS OF PENNSYLVANIA

Year	Tonnage Produced	Tonnage Used at Plants for Steam and Heat	Per Cent.
1903	75,232,585	6,395,582	8.501
1904	73,594,369	6,912,358	9.393
1905	78,647,020	7,122,394	9.056
1906	72,139,510	7,198,140	9.978
1907	86,056,412	8,217,439	9.549
1908	83,543,243	8,320,032	9.959
1909	80,223,833	8,103,810	10.101
1910	83,683,994	8,396,895	10.034
1911	90,917,176	9,152,073	10.066
1912	84,426,869	8,804,759	10.429
1913	91,626,964	9,357,762	10.213

At Home and Abroad

We have frequently pointed out that the conditions obtaining in the United States are not exactly paralleled in Europe and that certain measures in one country would not always give similar results in the other. Much has been made of the success in Germany in creating a system of syndicates, from which greater profits to industry have accrued. Steadier operation, less poverty, more complete conservation, increased safety, and greater efficiency are also alleged. These contentions are also true in a degree—what degree is hard to determine exactly.

Certainly greater returns to industry are desirable because only by the accumulation of profits can efficient operation be secured, and they are of value also as an encouragement to thrift. Moreover they are needed in bituminous coal mining, if the absorption of the independent operator by the railroad on which he ships in the hard-coal region is not to be completely duplicated in the soft-coal industry. Already in large parts of the bituminous field, the independent operator has become a small factor, the railroad, steel, and even the copper interests having such large operating investments.

But while profits are assured both for capital and labor by combinations of the former, the other advantages we have listed are not so certain. Steadiness of operation is as much threatened by market conditions as by an excess of productive ability brought on by unrestrained trade. As for poverty, the miner makes less per day in Germany under syndicates than he does here. The eliminating of privation is almost wholly due to the first alleged byproduct of syndication—steadiness of operation—and this we shall consider in detail later.

Conservation may come as an outcome of law, or as a result of the largeness of the initial outlay which puts a high premium on the coal in the ground, or because of the high value of the mineral in place. An assured profit would rather *permit* than *induce* operators to be less wasteful of resources. The most profitable way to mine coal is unchanged by an increase in the selling price of the product, so long as new coal reserves can at any time be acquired. As soon as they cannot, the value of coal lands will increase without syndication, and conservation will be self-enforcing.

As regards safety as a result of syndication, we must say that we are not impressed with the safety exhibited in German mines, believing it more largely due to natural safe conditions than to any other cause. As for greater efficiency, this is apparent only in machinery, not in output per man. We concede, however, that greater profits should have the effect of increasing the output per man and per ton of coal utilized for power and heat.

We pass over these matters lightly but we wish to discuss the item, steadiness of operation, at some length, because we believe the coal operator has been disposed to credit to German and indeed to British shrewdness a condition in which those people have exercised little or no control. We take issue with those who ascribe to intelligent provision what is really the outcome of sheerest luck.

A pamphlet entitled "A Statement of Facts concerning Conditions in the Bituminous Coal Industry in the States of Illinois and Indiana" states that "The average number of working days per annum in these two states is only about 175 out of a possible 300 or more." The same pamphlet shows a diagram exhibiting the number of shifts worked in the Westphalia district in Germany for several years. It averages well over 300.

But in Europe the market is not nearly so seasonal as in America. In England and Germany, which are not so agricultural as the United States, the demand for coal for industry occupies a more dominant position. And industry is the flywheel of the coal trade, at least in correcting the annual variations of the demand.

Moreover as the temperatures never become as low in Germany or England as they do here and as the winter is shorter these conditions again accentuate the importance of the industrial demand. Furthermore, as the coal freightage is an important item in railroad operation, the demands of the locomotives are immensely increased in the winter by the demand for coal, and thus the conditions which disturb the uniformity of trade have secondary effects, which disturb them further in their turn. Nor should we overlook the effect of wintry storms in adding to the consumption of coal in locomotives, by their injurious effects on the operation of railroads.

It also should be noted that both Germany and England have a large trade in warm countries where the demand is wholly industrial and where wood is largely used to supply what little heat is needed for cooking and house warming. The avidity with which Italians seize on store boxes and even tree limbs and carry them away for firewood is not so much the result of real thrift as of national custom. The sales of the European mine owners to tropical and near-tropical countries help to smooth the curve of seasonal variations in the coal trade of Europe.

Furthermore the bunker and coaling-station trade of Europe, which is large, goes on unceasingly through the winter and summer, though this has probably less effect in steadying trade in Germany than in Great Britain.

Now, among coal-producing states in this country, Indiana and Illinois by reason of their closeness to the agricultural states, into sixteen of which their product goes, suffer severely by the lack of balance caused by the seasons and must continue to suffer more or less in the very nature of things.

Unfortunately the United States, like all countries where the people as individuals enjoy a high degree of prosperity, suffers severely from ebbs and tides in industrial activity.

Moreover, because our credits are large, we are the first to suffer when a depression comes. Thus the flywheel of the coal trade, which is industry, is inefficient, and sometimes we wonder whether the domestic or the industrial trade is the reciprocator and we question which demand should be regarded as the flywheel. In 1914, for instance, it was the domestic demand which proved the more reliable. But in Europe both the industrial barometer and the thermoscope show less variation than they do here and the Westphalia Syndicate has little or nothing to do with that uniformity.

As we have said, however, more equitable, equable prices would be good for the industry, helpful to the miner and no loss to the country.

A Real Improvement in the Coal and Coke Business

From Birmingham, Ala., comes word that England has placed an order for 6000 tons of steel billets, that the rail mill at Ensley has prospects of uninterrupted operation for a considerable time, that the Italian government wants quotations on 250,000 tons of coal, and that the Hattie Ensley furnace broke three production records during January. West Virginia reports that conditions in the coal trade have greatly improved in the past 30 days and that production is rapidly increasing.

Out in Ohio, the Youngstown Sheet & Tube Co. is planning improvements in the way of byproduct coke ovens and a new mill to cost $6,000,000. In the Connellsville region of Pennsylvania coke ovens which have long been idle are awaking to new life. The H. C. Frick Coke Co. alone has put 2500 ovens into operation within the past month, and other furnace interests have made increases in like proportion. Throughout the Pittsburgh district generally, resumption of operations at mines and industrial plants is of daily occurrence.

Iron has long been regarded as an industrial barometer. When the country buys iron, it has money to buy other things as well, and usually buys them. The market for iron is reflected in that for fuel, for bituminous coal, and coke and gas. The facts and figures given above, while by no means indicating that a flood stage of prosperity is immediately upon us, reveal unmistakably that the slack water of depression is past, and that the tide of industry is setting in the right direction.

Connellsville coke production, which is a fair measure of iron production, has increased approximately 20 per cent. in the past month. All of this increase has been due to the activity of the furnace interests. In the language of a western Pennsylvania contemporary, "The Connellsville coke region is smoking up."

Sociological Department

The Colorado Fuel & Iron Co.'s Hospital

SYNOPSIS—The Colorado Fuel & Iron Co. has a large and efficient hospital at Minnequa, a point convenient to all its mines. Many model features have been introduced to add to the comfort of the patients and the success of the surgeons.

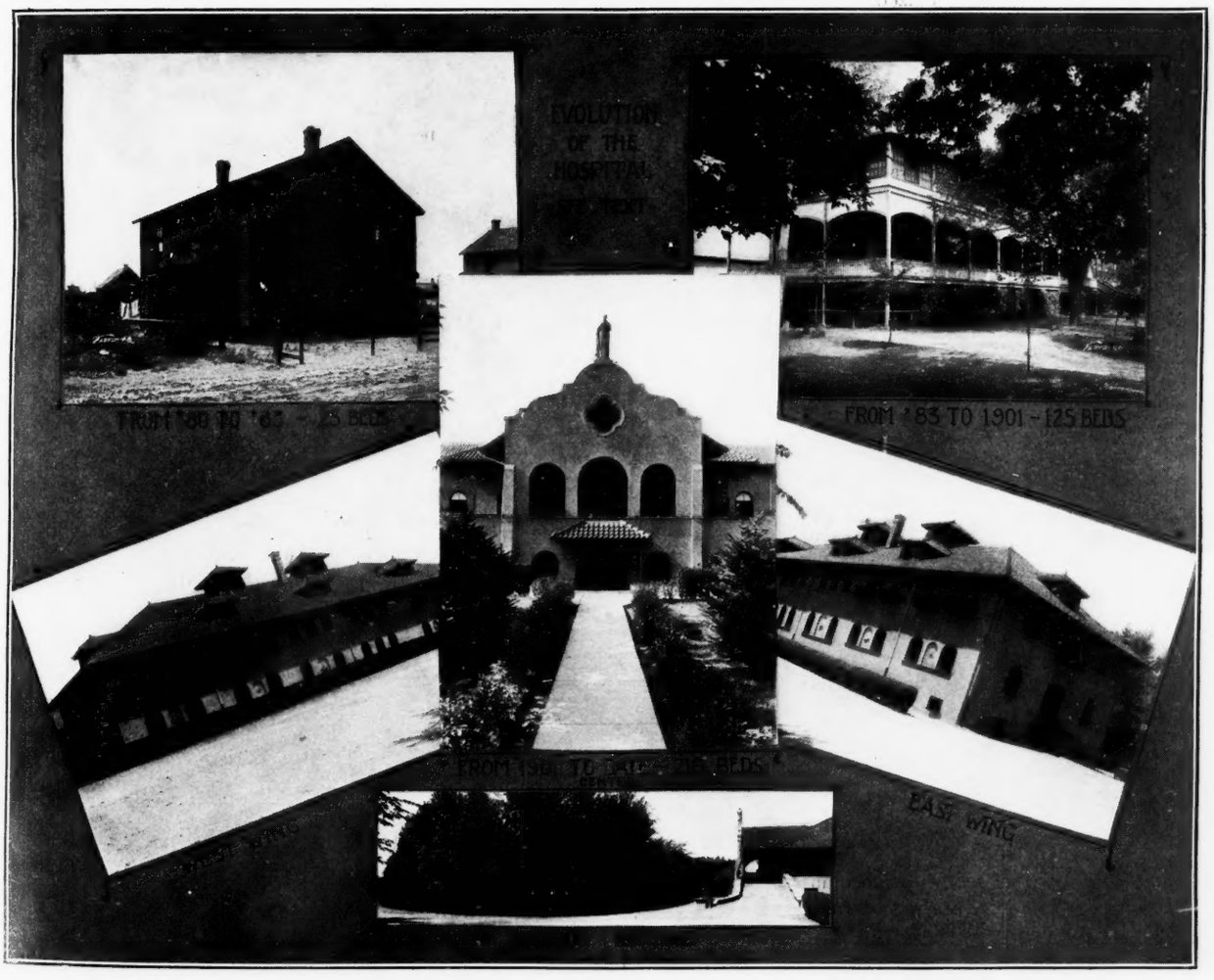
The pertinacious Frank P. Walsh, chairman of the Commission on Industrial Relations, asked John D. Rockefeller, Jr., at the recent inquiry in New York:

Would not a sociological department, such as Mr. Ford established, if it was set up in New York, keep you thoroughly informed concerning your employees?

Mr. Rockefeller replied without any show of irritation:

It would be entirely possible. But Mr. Ford showed he was making many millions of dollars, and so he could develop such a department with entire justice to his stockholders. But I think you will agree in the case of the Colorado Fuel & Iron Co., where the common stockholders have had no returns for many years, it would not be fair to undertake sociological work.

Mr. Rockefeller, at that inquiry, showed only a slight acquaintance with the affairs of the company and his reply would seem to indicate that he did not know that sociological work of importance was being conducted at the Colorado Fuel & Iron Co.'s mines or that annual reports were being made on the medical and sociological departments. We do not know when the first report was made, but we have before us the printed records of the medical department for 1907-1908 and sociological reports showing a well organized activity in 1903-1904.



THE COLORADO FUEL & IRON CO.'S HOSPITAL FORCE HAS TWICE MOVED TO LARGER AND MORE CONVENIENT QUARTERS

The public in the East does not know anything of the extremely valuable work which the company has done, sim-

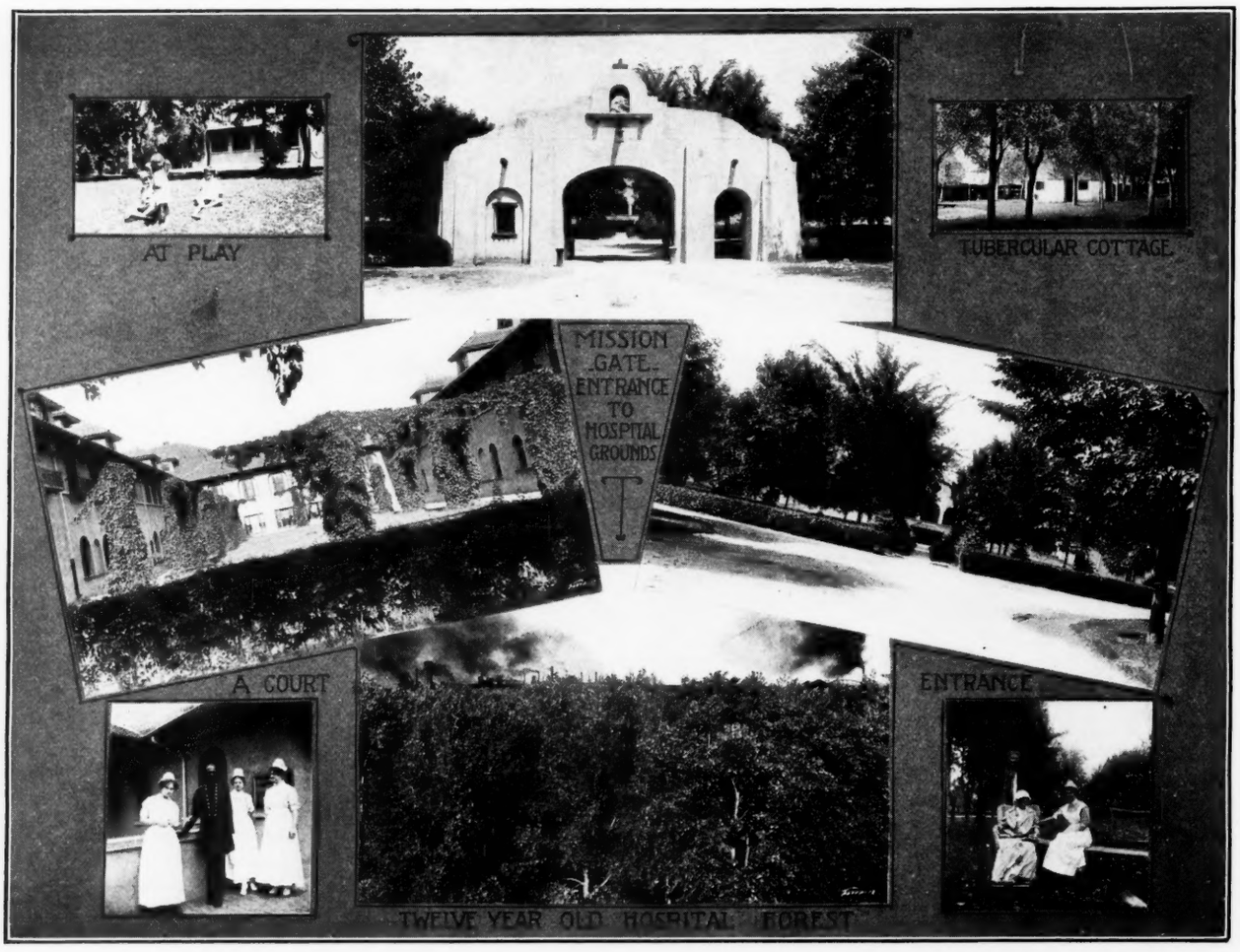
ply because of the failure to make such work public. A state organization with half as much deserving would have an efficient press writer to blazen its good deeds.

It is creditable to the New York "Survey" that it has not failed to speak favorably of the sociological work of the Colorado Fuel & Iron Co. while condemning unsparingly the alleged restriction of personal liberty by that corporation; nevertheless we are sure that up to the present no one has done that hospital work its due meed of justice. It may be added that even J. L. Lawson, the agitator of the United Mine Workers of America, admitted on the stand that the Fuel Co. had a "good hospital."

The three-day inquiry of the Industrial Relations Commission was partly devoted to the task of finding out what cannot be said. That this is not true, a few succeeding articles in COAL AGE will abundantly prove.

The purpose of the present article is to describe the extensive hospital of the Colorado Fuel & Iron Co., situated on Minnequa Lake, just south of Pueblo. This hospital treats both mining and steel-works cases. It is situated outside the coal fields, but is more convenient of access than if it were located at any one of the many coal-mining centers of the company which are situated in no less than six counties—Las Animas, Huerfano, Pitkin, Gunnison, Fremont and Garfield.

The pioneer hospital was one-half of a double frame dwelling, the scantiest kind of an attempt to meet the needs of the situation. Later the whole building was used,



SOME OF THE EXTERIOR VIEWS SHOWING SYLVAN SURROUNDINGS WITH THE STEEL WORKS NOT FAR DISTANT

Mr. Rockefeller did not know about the affairs of the Colorado Fuel & Iron Co. and in besmirching him with insinuations which he could not meet and defend, so little did he know about the matters in question. It did not serve, we fear, any good end and was purposed only to add luster to F. P. Walsh's dubious laurels. It is not every self-advertising agitator who has such a glorious opportunity to heckle a leading financier.

If he really wished to know about the Fuel Co. he should have asked J. F. Welborn in Denver, and he could have obtained the truth from him. The public is disposed to believe that what Mr. Rockefeller did not say for himself and for the corporation in which he is interested

but in November, 1883, a new hospital on Abriendo Ave., Pueblo, was completed and occupied, and to the company's medical advisers the new quarters appeared palatial. At first there were accommodations for 85 patients and later room was made for 40 more, but by 1900 these quarters were found too restricted, and the ideas of the company had developed so that the officers were no longer satisfied with the accommodations.

THE MINNEQUA HOSPITAL

It was decided therefore to build a fine hospital at Minnequa, where 20 acres of land were purchased, which has in the few years intervening become a forest.

It is not necessary to describe the hospital in full, for the pictures show how adequate it is for every requirement. It should be noted that it is practically only two stories high, so that it is exceedingly safe in case of fire. Furthermore every room fronts on the outside of the building. There are both X-ray and pathological laboratories. The former has a Scheidel-Western interrupterless X-ray coil with all accessories for doing the fastest and most deep-seated work. At the time of its installation it was the only machine of like capacity in southern Colorado and may yet be unexcelled.

The floor, ceiling and three of the walls of the operating room form a continuous sheet of lead, which reflects none of that cross light which is so annoying to the surgeon. The material is also waterproof, nonabsorbent and crackless; thus it offers no refuge for germs and no place which cannot be thoroughly cleaned. The floor is noiseless and not slippery. The fourth wall, which faces the north, is entirely occupied by a large sheet of plate glass, through which the room is lighted.

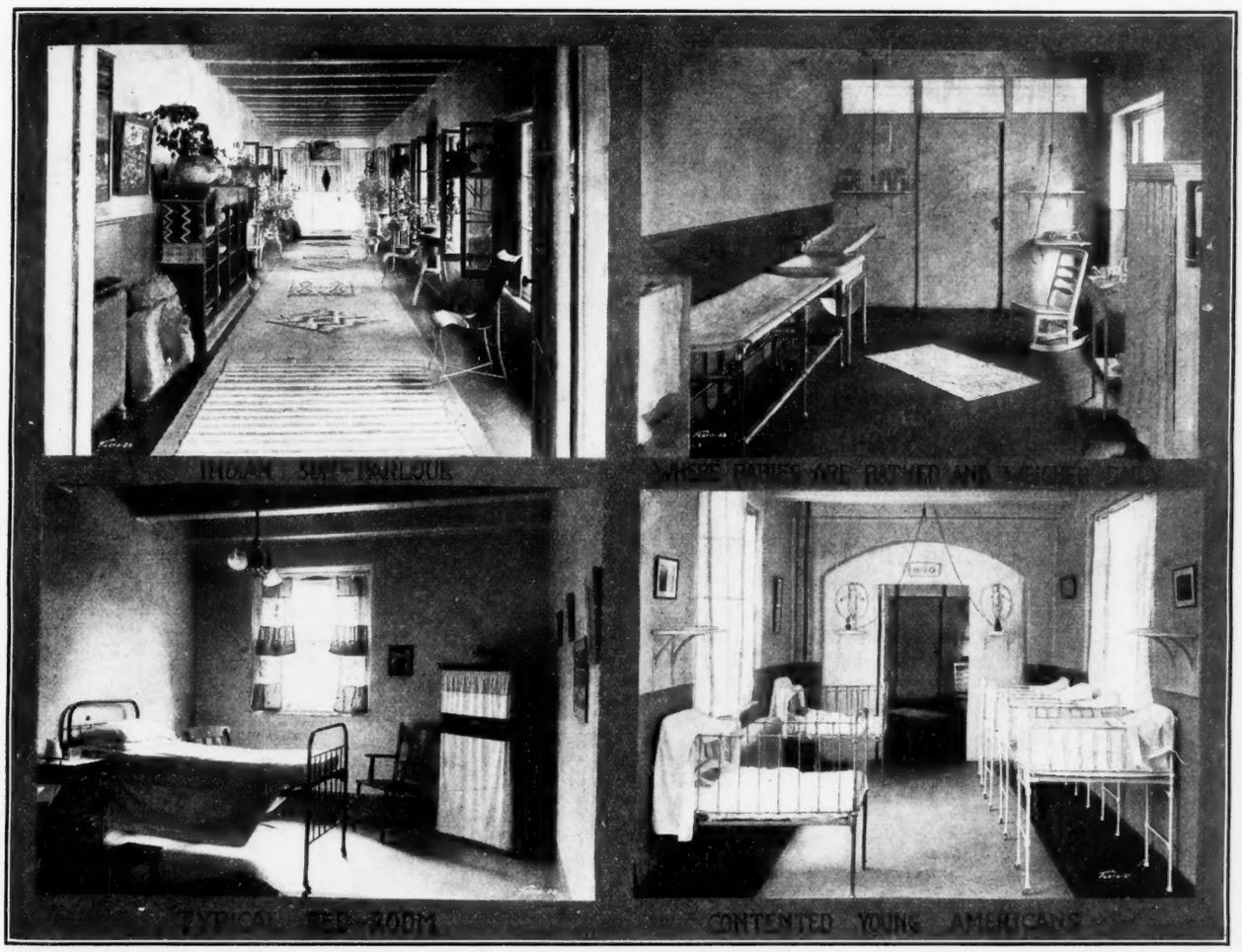
The room in which anaesthetics are administered is painted in green and decorated with pictures and frames in sepia and other browns—colors which psychologists say are least irritating to sufferers. The curtains are white. A sensitive or nervous patient is especially affected by unpleasant surroundings, hence the less disagreeable and shocking the environment, the more a patient is likely to take an anaesthetic without resistance. A struggle involves loss of strength, which, of course, is detrimental to the patient during and after an operation.

So, to avoid unpleasant thoughts, the patient is allowed to see no instruments, no preparation for operation, no doctors, nor nurses in operative regalia, and to hear no sounds suggestive of operation. The anaesthetic is given by a specialist, assisted by a nurse who accompanies the patient from the ward. The subject is unconscious when removed to the operating room.

No Stairs in the Hospital

Another excellent feature is the fact that there are no stairs in the hospital. As Doctor Corwin states in his report, any given tread and rise in a stairway are suited to patients of a certain strength and height and ill suited to all others. They are never desirable for the travel of cripples and children and are never really safe.

Of course, an elevator is an excellent convenience, but it is inadequate in a fire. As the Minnequa hospital is only two stories high, it is possible to use slopes or ramps leading from the ground floor to the story above. Up and down these inclines the wheeled chairs and beds on rollers can be pushed with ease.



Where in Quiet and Sunlight Human Repairs Are Effected

In 1913 a contagious-diseases ward was added. In the building pleasantly termed the Casa Vivienda, the doctors and nurses live in most comfortable quarters and here lectures are given to the latter. Laura A. Beecroft who graduated at the West Penn Hospital in Pennsylvania is matron.

The Nurses' School

These nurses take a three-year course. During the junior year they study anatomy, nursing, materia medica, bacteriology and medicine. The second or intermediate year they are taught anatomy, nursing, bacteriology, dietetics, materia medica, bandaging, nursing ethics and medicine. The senior year embraces the study of clinics, anatomy, obstetrics, bandaging, surgical technique and materia medica, and lectures are given on hygiene, gynecology, eye, ear, nose, throat and nervous diseases. The course includes three months' obstetric experience in a Chicago hospital.

The operating table in the obstetric ward is cleverly arranged with wheels that can be raised or lowered so that there is no need to remove the patient to a litter but the table itself can be transported to the bedside, thus saving unnecessary lifting.

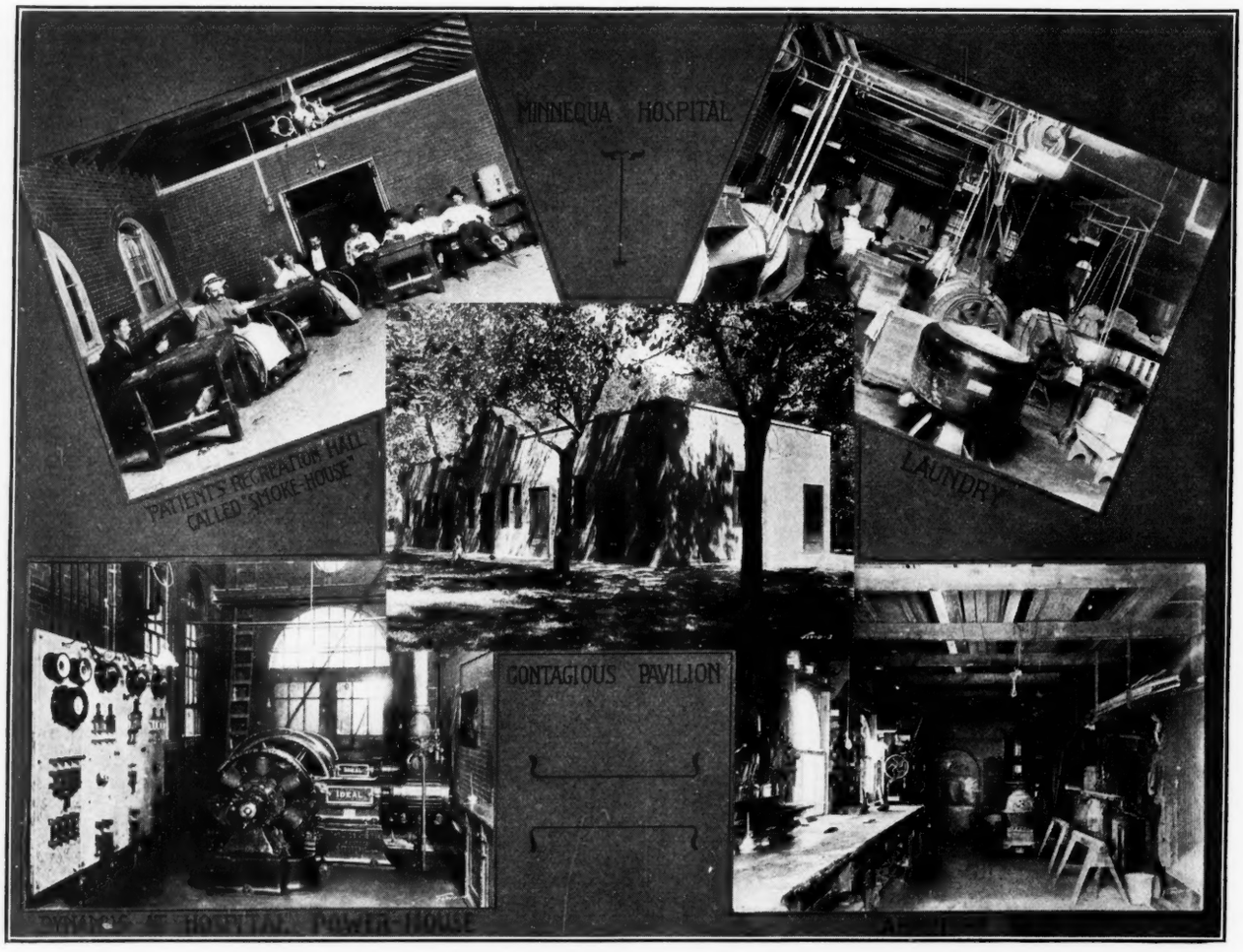
Each department is handled by experts. Dr. R. W. Corwin, the chief surgeon, attends all cases requiring the surgical care of the abdominal and pelvic regions. Dr. William Senger attends diseases demanding medical treatment and those needing surgical treatment of the head and neck. Obstetrics and surgery of the chest and extremities fall to Dr. Bon O. Adams. Diseases of the chest and the administration of anaesthetics are apportioned to Dr. R. H. Finney. Diseases of eye, ear, nose and throat are tended by Dr. J. J. Pattee. Dr. Josephine M. Dunlop is the pathologist. Dr. Philip Work acts as interne. Henri T. Mershon is the radiologist.

Polyglot Health Bulletins

Doctor Corwin issues a monthly bulletin on sanitary and sociological subjects. In September, 1914, it was about the health of infants; in October and November, about that of children. In December it discussed in plain terms the health of school children and the dangers of germs. These bulletins are translated into Polish, Spanish and Italian and being in the simplest of language cannot fail to convey their message of safe and sane living.

Subjects treated include alcoholism in infants, the crime of feeding children with all kinds of indigestible materials, the dangers of decayed and uncleaned teeth and the continual menace to which school children are exposed, if proper precautions are not taken, when drinking, eating and playing together.

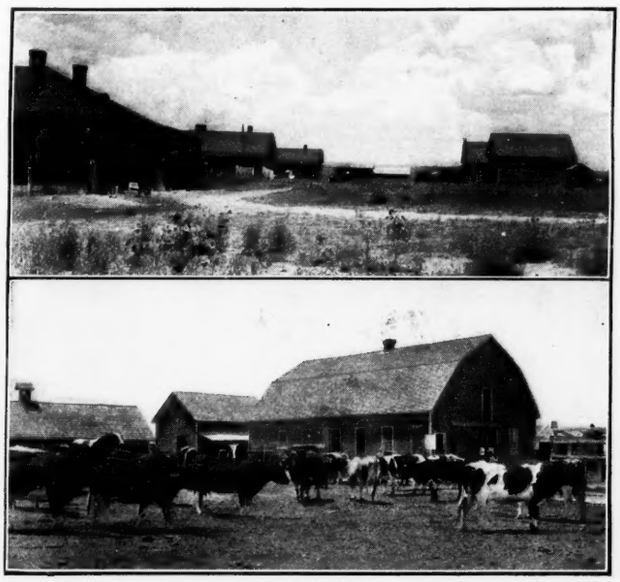
Colorado has a healthful climate but as a result it is full of sickly people who come from other climes to re-



The Hospital Has an Extensive Equipment as Well as Every Comfort

cover their depleted strength. Consequently there is need for residents to be at least as careful to avoid exposing themselves to disease as in other states where climatic conditions are more trying to the afflicted.

As will be seen in the illustrations, the hospital has its own farm thus securing to the patients uncontaminated that part of the dietary which is most necessary for their well-being. Other pictures of the hospital will be published in an early issue.



THE MINNEQUA HOSPITAL FARM

Panama-Pacific Exposition First-Aid Meet

It was decided at the Terre Haute, Ind., meeting of the American Mine-Safety Association last year that the Third National Contest should be held at Pittsburgh in connection with the Second National Mine-Safety Demonstration. It will be remembered that the first demonstration, held Oct. 31, 1911, was practically the parent of the association. W. H. Taft, then President, W. L. Fisher, then Secretary of the Interior, and many other notables were present.

The second demonstration, however, was to be held as part of the dedication of the new Bureau of Mines buildings at Pittsburgh. Seeing that these will not be ready for dedication or occupancy till 1916, the demonstration must be delayed, so the advantage in holding the association meeting in Pittsburgh in 1915 is no longer apparent, especially as it is inadvisable to choose any one place for two consecutive years.

The Second Mine-Safety Demonstration will be at least as important as the first, as it is intended that the date shall be arranged so that the President and other important Government officials can attend as in 1911.

In consequence of the facts mentioned the secretary of the American Mine Safety Association, H. M. Wilson, engineer-in-charge of the work of the Bureau of Mines in Pittsburgh, invites suggestions as to the proper provisions to be adopted. He suggests that the meeting might be held in Ishpeming, Mich., or in Fairmont, W. Va., or possibly in Knoxville, Tenn. In the latter place it would be combined appropriately with the Annual Southern Interstate Contest. There are other places also where annual contests are held and these might well be considered as possible places for the Association's meet.

He also suggests that it might be well to consider the possibility of regarding the Panama-Pacific Field Meet as the Association's regular event. As this is so far in the West it is probable that only a few Eastern teams will compete. It is feared therefore that the event could hardly be regarded as national.

With the letter in which the above statements are made and suggestions invited is one also from Mr. Wilson asking for entrants for the meet at San Francisco, Sept. 23 and 24, and one from J. A. Holmes, director of the Bureau of Mines, requesting suggestions as to that contest.

It is proposed that the first day be devoted to a demonstration of skill. All who enter will be given souvenir banners, badges or other mementos. All teams will be rated by the judges but the two in any state which receive the highest award shall be eligible to compete on the second day for interstate supremacy and the award of prizes.

All teams are invited to enter. Each team will have to pay its own charges for traveling and maintenance, but there will be no entrance fees. It is expected that each team will provide its own rescue and first-aid equipment, though, on advance request, the Bureau of Mines may lend its artificial breathing apparatus. The Bureau is anxious to be of service and to aid in the instruction of teams desiring to enter. It invites suggestions of all kinds as to the conduct of the meet.

The contest at San Francisco will give the participants an enlarged sense of the value and importance of the great work in which they are engaged and stimulate not only the competing teams but those which have failed in the elimination contests for they will realize what a slightly greater proficiency in training might have won for them.

A Thought on the War

Charles Wagner in "Justice" strikes a happy note when he says the following:

"Along the ponderous lines of march of hostile armies ready for the shock of battle, among engines of war unknown to the ancients, I distinguish something still more foreign to them. It is a red cross, the common emblem of whole corps of doctors, guards and nurses, with the paraphernalia of their calling.

"Tomorrow, when war has done its work, and even in the thick of the fight, these people will rescue the wounded, bind up their wounds, watch over them, without asking to what country they belong. They will be doing the fine and simple deed that Christ immortalized in the parable of the Good Samaritan.

"As I look at them I think—this thing will kill the other. The sentiment which leads you to run to each other's aid, even under a rain of bullets, will some day be stronger than all the reasons put together that draw you into this inhuman warfare.

"The red cross will triumph over the cannon.

"The future belongs to the nurse, to the little gray sister, to all helpful powers, however humble; for two allies are theirs—suffering humanity and the merciful God."

Discussion By Readers

Mining Laws, Legislation and Mine Regulations

Letter No. 30—In the discussion of needed mine legislation there is no more important subject than the relation of the mine foreman to the state and state law in which the mine is located over which he has charge.

Attention has been drawn many times to the difficult position occupied by mine foremen and the suggestion has been made previously, COAL AGE, Vol. 5, p. 899, that, in justice to a large number of this class of faithful and conscientious men, who are often placed in difficult situations by the requirements of the law, the mine foreman should be a state official, acting under the supervision and by the direction of the mine inspector of the district or state in which his mine is located. Such a provision of the state mining law may possess some legal difficulties; but these certainly cannot be greater than what exists at the present time. Reference was made to this condition by quotations cited from the bituminous law of Pennsylvania, in the letter to which I have just referred.

Anyone familiar with the situation knows that a large portion of the mine foreman's time is commanded by the Department of Mines or the state mine inspector, compelling him to see that the provisions of the mining law are strictly obeyed. On the other hand, the mine foreman is an employee of the company or operator of the mine, who demand his entire energy in maintaining the daily output of the mine at its full capacity. The foreman is, in fact, a "coal-getter" in the sight of his employer, but a safety inspector in the eyes of the law.

This condition and unfortunate position of the mine foreman have been well described in Letter No. 25, COAL AGE, Jan. 30, p. 217, where the mine foreman is referred to as a "bumping block" between the inspector and the company. I believe safety in mines requires that the mine foreman should be placed on an equal basis with the district mine inspector if he is to be held responsible for the operation of the mine in compliance with mining laws. Such a provision would enable him to see that the law is carried out, without subjecting him to the danger of the loss of his position, as is the case under the present existing conditions.

It frequently happens that some of the most vital requirements of the mining law conflict with a company's policy or established methods in the operation of the mine; and this, naturally, places the mine foreman in an awkward position. His desire to please his employer often brings him into conflict with the law. No argument is required to convince one that there is, as stated in Letter No. 25, a "bad kink" in the mining law in this respect. If the purpose of the law is to insure the greatest safety in mining and reduce the number of mine accidents, why not remove the mine foreman from the unfortunate position in which he is placed by the requirements of the law and enable him to act freely as his judgment and knowledge dictate? To overcome the difficulty presented by the compensation of the foreman by the state, the law might require the coal operator to pay into the state treasury a sum of equal value.

In order to still further secure the position of mine foreman, in respect to the correctness of his judgment in the operation of the mine, the law should provide that the mine foreman shall be given a fair trial before removal from office, by an executive board composed of at least two district mine inspectors and one member of the operating company. In my estimation, this would be a just and practical way of removing the present intimidation under which the mine foreman is obliged to act at the present time

PHILIP M. WEIGLE.

Hooversville, Penn.

Letter No. 31—The discussion in COAL AGE of what is needed to improve the present mining laws in different states calls to mind a very interesting problem that is now before the courts and the Pennsylvania state legislature as to the eligibility of certain applicants for mine foreman's certificates. According to the anthracite mine law, in order to obtain a mine foreman's certificate, the applicant must not only be able to pass the required examination, but must also give "satisfactory evidence of at least five years' practical experience as a miner." The question is now being fought out in the Pennsylvania courts, What is to be understood by the words "practical experience as a miner"? Does the law necessarily require a candidate for a mine foreman's certificate to spend five years in the actual blasting and loading of coal at the face; or may it mean that time spent in the mines, following the different lines of work necessary to the operation of a colliery?

Judge McCarrol, presiding over the Dauphin County court, recently handed down a decision in favor of the latter version; but an appeal has been made from his decision and the question will probably be carried to a higher court.

There is now a bill before the legislature introduced by Hon. A. B. Garner of Schuylkill County, to change the reading of this law, so as to make its meaning more definite if it is required that a man must actually mine coal for five years in order to become eligible for a mine foreman's certificate.

The question may well be asked, however, Is it necessary that a man should spend five years at the face blasting coal, in order to become a competent mine foreman? Let us look at the question from both sides and, to illustrate, take the careers of two young men working in an anthracite colliery.

Both of these young men, we will say, start in the breaker picking slate, but soon get jobs inside the mine tending doors or switches or spragging cars at the bottom of the shaft or slope. Later, following the ambition of most boys in mines, they will probably be found driving mules. From this point their careers may diverge: "A" having grown big and strong gets a job

laboring for a miner in a gangway or breast. If in a gangway or flat breast, his principal duties for a time will be loading the cars and helping the miner to stand timber. After a while he is given a breast auger and starts drilling holes for blasting, working under the supervision of the miner, who prepares the charge and loads the hole.

After two years of this work, "A" is entitled to and obtains a miner's certificate. For three years longer, he works a gangway or breast as a miner, with one or more laborers to help him. During all this time his work has been strictly at the face and he has become very proficient in the shooting of coal and in standing timber. If the mine is a gaseous one and all of his section is on safety lamps he, of course, becomes familiar with the construction and use of the lamp. If he is observing he learns from the fireboss and the more experienced miners the manner of detecting and handling gas. If he is studious and ambitious, he studies in his spare time and takes the examination and is granted a certificate which qualifies him to take a position as fireboss, and later he becomes mine foreman.

Now, let us see what "B" has been doing all these years. Instead of getting a job of laboring for a miner, after driving mules, he works as a company man on repairs. He is put to work with one or two men who have been employed, possibly for several years, laying and repairing track, putting in switches, building and repairing brattices, batteries and stoppings. He is often called to assist in putting a derailed car or trip back on the track or to replace a set of timber that has been knocked out. The fireboss may call him to help run a brattice to the face of a gangway or breast where there is an accumulation of gas. Sometimes a pump runner is out and the foreman calls on him to take the man's place.

Thus, "B's" experiences are many and varied although he has never blasted a pound of coal; but he too is ambitious and observing. While repairing track or putting up brattice at a working face, he has learned how the miner makes his cut, places his holes, prepares the powder and loads, tamps and shoots the hole. In building stoppings and carrying brattice, he has learned the methods of ventilation and become familiar with the construction and use of the safety lamp. When assisting the fireboss he has noted the cap on the lamp when it is taken into gas, and observed the flame that is produced by a greater percentage of the gas, and has learned how to handle the lamp under these conditions. He has been taught how to carry off the gas without endangering the lives of the workmen. He is often called to go into old workings to lift track or draw timber and learns by experience the danger of blackdamp. The repairman is often sent to assist the engineers in making surveys. When laying track at the foot of a slope or on a plane, he sees the importance of the use of a blueprint or plan. He thus comes in touch constantly with important phases in mining that the man who spends all his time at the face never sees. He is called on to assist in the work of laying steam and water pipes to and from the pumps.

In short, there is scarcely any work necessary in the mining of anthracite coal with which "B" does not come in contact, sooner or later. While he has had less experience than "A" in the handling of explosives, the shooting of coal, the dressing of a face and setting timber, in all other essentials of mining he has had as much experience or more. Provided, then, that each of these men passes the required examination satisfactorily, is not one just as much entitled to a certificate as the other?

GEO. D. EVANS.

Pittsburgh, Penn.

Longwall in the Pittsburgh Seam

I notice, in the excellent account given of the last meeting of the Coal Mining Institute of America, held at Pittsburgh, Dec. 8, 1914, that W. Seddon opened the discussion of the question: "Is the Longwall System Applicable to the Pittsburgh Seam of Coal?" It is stated, COAL AGE, Dec. 19, p. 986, that S. A. Taylor followed Mr. Seddon and pointed out the lack of adaptation of the longwall system of mining to this seam, known in Ohio as the "No. 8 seam." Mr. Taylor is reported as saying that "the roof breaks up too high, sometimes as much as 20 ft.; and the bottom is too soft."

I fail to understand how this reference of Mr. Taylor's applies to the discussion of the longwall system of mining, since success or failure in longwall is not a question of the roof breaking high, but rather a uniform settlement of the overburden on the packwall and the waste of the seam. I would suggest that the longwall system, properly applied, avoids the "high breaks" that would occur in other systems of mining. The matter of chief concern in longwall work is that the roof strata immediately above the coal are not too frail, so as to permit the weight of the overburden to be thrown forward on the face sufficiently to break down the coal and, at the same time, keep the face open for work.

Neither does the fact that the bottom is "too soft" apply so much to longwall work as it does to room-and-pillar work; because, in the former case, the roof pressure is distributed uniformly over a greater area, while in the latter the weight resting on the pillars often causes a soft bottom to heave and obstruct the roadways, thereby causing much annoyance and expense. This condition is very largely eliminated in the longwall method when the packwalls are properly built and there is sufficient waste material. Moreover, there are in the longwall method less roadways to maintain and more space is available for storing the waste.

I would remind those gentlemen whose remarks did not favor the adoption of longwall in the working of coal in the Pittsburgh measures that many of the deepest shafts in the world are worked longwall. From one to three years were required to sink these shafts, which are equipped with the most uptodate machinery at great expense. The longwall system of mining has been generally adopted in these cases, because it means a more complete extraction of the coal, at a lower cost.

It is quite common for men not acquainted thoroughly with the principles and practice of the longwall system of mining to object to its adoption in their mines, preferring to use the old methods with which they are familiar. Some years ago, the Youghiogheny & Ohio Coal Co., in eastern Ohio, held monthly meetings. At one of these meetings, the longwall system was discussed by the men present, and it was remarkable to hear the numerous

objections raised to this method, by men who were unfamiliar with its working. One of the superintendents said that "the roof would not stand"; another said that they "could not get the coal out of the rooms which were 200 ft. deep"; another asked, "How would it be possible to ventilate the workings on the longwall plan?" Many of these questions showed that the men were not familiar with the principles of longwall.

I believe that the conditions in eastern Ohio are as favorable for longwall work as could be desired. When one considers the expense of working a block of coal, say 400x800 ft. on the room-and-pillar plan; driving, say 50 rooms on 32-ft. centers a distance of 200 ft.; and sums up what must be paid for yardage in turning rooms and driving breakthroughs between them; and takes into account, besides the delay and cost of taking the machines from room to room to cut the coal, the laying of tracks in the rooms and switches on the entries and other expenses such as the increased cost of gathering the coal at the face, to say nothing of the large percentage of pillar coal lost beyond recovery, even the most skeptical must allow that the longwall system presents advantages not possessed by any other method of mining.

For example, contrast the conditions just mentioned with the fact that the longwall method permits the entire extraction of the coal with a large reduction of expense for maintenance of roads, timbering and ventilation, besides reducing the number of drivers and mules required and the mining of the coal in better shape, generally, with less loss in fine coal and dust. In my experience, one or two mules for an output of 500 or 600 tons in longwall work would compare favorably with seven or eight mules for the same output of coal in the room-and-pillar system of mining.

The extra expense for the building of packwalls in longwall work is more than compensated for by the reduction in other expenses that I have mentioned. It would be necessary in adopting this method to form a new scale for machine men and loaders, since this work would not be as difficult or consume the time that would be required in room-and-pillar work. I would suggest, in closing, that the adoption of the longwall system of mining coal, in eastern Ohio, might prove the solution of the present strike difficulty in that state.

G. R. WADDELL.

Moundsville, W. Va.

The Mine Superintendent

Letter No. 1—The foreword, COAL AGE, Nov. 21, p. 815, arrested my attention; I read the same with great interest and care. It is the story of a superintendent of a coal mine who, in an attempt to bridge over the market conditions that were seriously embarrassing his manager, proposed to reduce the cost-sheet by temporarily cutting out the yardage account for driving new entries.

He very generously suggested to the manager that he could recover this by double-shifting the entries at a later time when market conditions were improved. When this improvement came, however, the demand for coal found the mine superintendent unable to bring the daily output up to the desired point; and for this he was severely censured by the mine manager, who laid the entire blame for the shortage on the superintendent's shoulders.

Assuming that this is a supposed case, I fail to find any justification for the implied suggestion that the results called for the superintendent's resignation. In any judicial case, where a second person is privy to a deal, he is held equally guilty with the first party. I would suggest that, in the present instance, the manager had every confidence in his superintendent, and together they agreed on a plan that would reduce the cost of producing coal. Both were alike responsible for the results. It may be assumed that the manager was afraid that the outcome would cast a shadow on his reputation and fearful of being criticized for an error of judgment, he laid the whole blame on his superintendent. However, no man with red blood in his veins would do this, but he would share the responsibility with his superintendent.

This superintendent, with a heart as big as a pit wagon, with neither malice nor prejudice, and loyal to his manager as Damon to Pythias, was purely the victim of circumstances. The unfortunate conditions that resulted in the superintendent's downfall might have been avoided, possibly by a modification of the system of mining, with a view to reducing the price paid for narrow work. Or, perhaps, the selling price of the coal might have been advanced by improving the quality of the output; or by producing a greater percentage of lump coal that would bring a higher price, by using a different powder for blasting or by a different system of mining the coal.

However, with great generosity, he suggested a method by which he assumed the entire burden of the condition prevailing in the market. I am forced to the conclusion that the manager had two codes of ethics, one of which he applied in his dealing with the superintendent, while he employed the other in all transactions with his board of directors or stockholders. I agree fully with the moral suggested in COAL AGE, namely: "It is easy to overrun a credit account." But I am convinced that the *manager* and not the *superintendent* was the guilty party in this respect.

The story teaches that extreme economy is neither wise nor prudent, and any false measures employed to tide over a depressed condition are always expensive in the end. It would have been better for this condition to have been met by the manager making arrangements for deferred payments on interest-bearing debts, or in some similar way, as the trouble arose from a depressed market condition for which the operation of the mine was not responsible.

R. Z. VIRGIN, Supt.,
West Virginia-Pittsburgh Coal Co.

Colliers, W. Va.

Effect of Head on Motor in Pumping

Referring to the inquiry of Richard Todhunter, asking what will be the effect on the motor driving a centrifugal pump if the discharge head is reduced from 150 ft. to 75 ft. while the motor is operated at the same speed, COAL AGE, Jan. 23, p. 178, permit me to say that I think the pump engineers are in error when they claim that "the motive power is considerably overloaded" owing to a large quantity of water passing through the pump when the latter is discharging under a reduced head.

In the assumed case, the pump motor has a constant speed, which means that this motor is shunt-wound. If

the head under which the pump discharged were to be increased from 150 ft. to 300 ft. I would say that the motor would become overheated and burn out under the increased load; but, in the present case, when the discharge head is decreased from 150 ft. to 75 ft. and the load on the motor reduced thereby it would be impossible for the machine to be overloaded. Under the reduced head, the amount of water pumped will undoubtedly be greater than before; but the rate of increase in quantity is not as great as the rate of decrease in head; and, as a consequence, there is a decrease of load and the motor will perform its work more easily than before.

For the sake of illustration, let us estimate the power required to operate the pump—first, under a head of 150 ft. and then under a head of 75 ft., assuming a general efficiency of, say 65 per cent. in each case. The size of the pump not being given, I will assume that it is capable of producing a velocity of 400 ft. per min. in the column pipe under a head of 150 ft., which gives

$$G = \frac{0.7854 \times 4^2 \times 400 \times 12}{231} = \textit{say } 260 \textit{ gal. per min.}$$

We may assume that, under this head, there is a slippage of, say 15 per cent. Then, 260 gal. per min. is 85 per cent. of the theoretical discharge of the pump, which is therefore 260 ÷ 0.85 = say 300 gal. per min.

The loss by slippage in the pump will vary directly as the square root of the head, which would make the loss when the head is reduced one-half $\sqrt{0.5} = 0.7$ of the loss in the first case. The loss in the first case was 300 — 260 = 40 gal. per min.; and, in the second case, it is 40 × 0.7 = 28 gal. per min. This makes the discharge under the reduced head, 300 — 28 = 272 gal. per min., as compared with 260 gal. per min. under the full head of 150 ft.

Now, estimating the power required to operate the pump in these two cases, we find,

First case, $H = 0.00034 \times 260 \times 150 =$ say 13 hp.
Second case, $H = 0.00034 \times 272 \times 75 =$ say 7 hp.

Electrically, assuming a line voltage of 220 volts, the current consumption in each case would be, since 1 hp. = 746 watts,

First case, 746 × 13 ÷ 220 = 44 amp.
Second case, 746 × 7 ÷ 220 = 24 amp., nearly.

I think this illustration, showing as it does a lower power consumption under the reduced head, should prove that a shunt-wound motor having a constant speed could not be overloaded by reducing the head of discharge.

H. D. ROBERTS,
Mine Foreman.

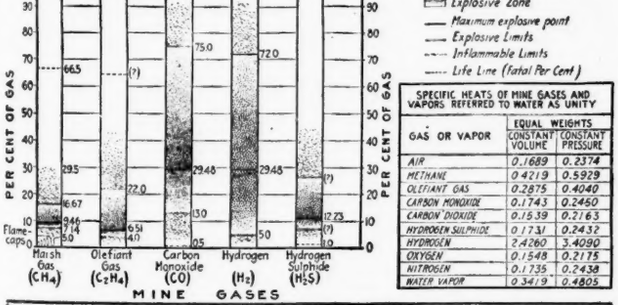
Rock Forge, W. Va.

Study Course in Coal Mining

BY J. T. BEARD

The Coal Age Pocket Book

Explosive Mine Gases—The diagram given below combines, in a compact form, most of the important reactions and data, relating to the combustion and explosion of those mine gases that form explosive mixtures with air. In the upper left-hand corner is a graphic illustration of the relative extent of the explosive and inflammable zones of each of these gases



SPECIFIC HEATS OF MINE GASES AND VAPORS REFERRED TO WATER AS UNITY

GAS OR VAPOR	EQUAL WEIGHTS CONSTANT VOLUME	CONSTANT PRESSURE
AIR	0.1689	0.2374
METHANE	0.4219	0.5929
OLEFIANT GAS	0.2875	0.4040
CARBON MONOXIDE	0.1743	0.2450
CARBON DIOXIDE	0.1539	0.2163
HYDROGEN SULPHIDE	0.1731	0.2432
HYDROGEN	2.4260	3.4090
OXYGEN	0.1548	0.2175
NITROGEN	0.1735	0.2438
WATER VAPOR	0.3419	0.4805

GAS	SYMBOL	MOL. WEIGHT	DENSITY (H=1)	SP. GRAVITY AIR=1	WEIGHT (LB. PER CU. FT. 60° F. BAR. 30")	VOLUME CU. FT. PER POUND	EQUATION SHOWING COMBUSTION OF GAS IN OXYGEN	HEAT OF COMBUSTION IN OXYGEN B.T.U. PER POUND
METHANE LIGHT CARBURETED HYDROGEN MARSH GAS	CH_4	16	8	0.559	0.0428	23.36	REACTION $CH_4 + 2O_2 = CO_2 + 2H_2O$; MOLECULAR WEIGHT 16 64 44 36; RELATIVE WEIGHT 1 4 4 9/4; RELATIVE VOLUME 1 2 1 2	BURNED TO CO_2 AND H_2O AT 32° F. 23,513
ETHENE ETHYLENE OLEFIANT GAS	C_2H_4	28	14	0.978	0.0749	13.35	REACTION $C_2H_4 + 3O_2 = 2CO_2 + 2H_2O$; MOLECULAR WEIGHT 28 96 88 36; RELATIVE WEIGHT 7 24 22 9; RELATIVE VOLUME 1 3 2 2	BURNED TO CO_2 AND H_2O AT 32° F. 21,344
CARBON MONOXIDE CARBONIC OXIDE	CO	28	14	0.967	0.0740	13.51	REACTION $2CO + O_2 = 2CO_2$; MOLECULAR WEIGHT 56 32 88; RELATIVE WEIGHT 7 4 11; RELATIVE VOLUME 2 1 2	BURNED TO CO_2 4,325
HYDROGEN	H_2	2	1	0.0696	0.0053	188.68	REACTION $2H_2 + O_2 = 2H_2O$; MOLECULAR WEIGHT 4 32 36; RELATIVE WEIGHT 1 8 9; RELATIVE VOLUME 2 1 2	BURNED TO H_2O AT 32° F 62,032
HYDROGEN SULPHIDE SULPHURETED HYDROGEN	H_2S	34	17	1.1912	0.0912	10.96	REACTION $2H_2S + 3O_2 = 2SO_2 + 2H_2O$; MOLECULAR WEIGHT 68 96 128 36; RELATIVE WEIGHT 17 24 32 9; RELATIVE VOLUME 2 3 2 2	BURNED TO SO_2 AND H_2O AT 32° F. 7239

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DIAGRAM OF EXPLOSIVE MINE GASES

when mixed with air. The horizontal lines, in each gas column, mark, approximately, the maximum explosive point and the lower and upper explosive and inflammable limits; also the fatal percentage is indicated by the dotted lines. These marks are explained by the legend in the upper right-hand corner. The specific heats are given for equal weights of the gases, for constant volume and constant pressure, referred to water as unity.

The Coal Age Pocket Book

Diagram of Testing Lamps—The diagram given below is of interest in connection with the testing for gas with different types of safety lamps burning hydrogen, alcohol, naphtha or a nonvolatile oil. In the upper right-hand corner are given the heights of flame cap or elongation of flame caused by different percentages of methane or marsh gas present in the mine air. The presence of other gases or dust will, of course, modify the results, as has been previously explained. The effect of carbon dioxide is to diminish the length of the flame and destroy the cap. On the other hand, carbon monoxide and dust lengthen the flame and assist the formation of the cap.

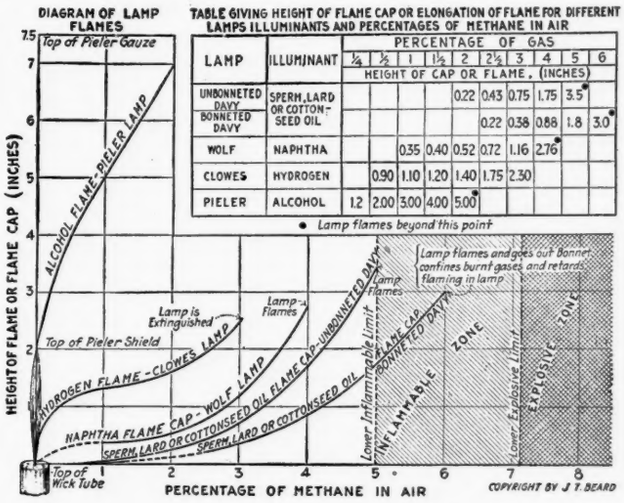


TABLE GIVING HEIGHT OF FLAME CAP OR ELONGATION OF FLAME FOR DIFFERENT LAMPS ILLUMINANTS AND PERCENTAGES OF METHANE IN AIR

LAMP	ILLUMINANT	PERCENTAGE OF GAS ½	½	1	1½	2	2½	3	4	5	6
		HEIGHT OF CAP OR FLAME, (INCHES)									
UNBONNETED DAVY	SPERM, LARD OR COTTONSEED OIL					0.22	0.43	0.75	1.75	3.5	
BONNETED DAVY						0.22	0.38	0.88	1.8	3.0	
WOLF	NAPHTHA			0.35	0.40	0.52	0.72	1.16	2.76		
CLOWES	HYDROGEN		0.90	1.10	1.20	1.40	1.75	2.30			
PIELER	ALCOHOL	1.2	2.00	3.00	4.00	5.00					

• Lamp flames beyond this point

DIAGRAM OF FLAME CAPS IN TESTING FOR GAS

The heights of flame cap given for the Davy and Wolf lamps are the minimum caps, produced by drawing down the flame to its lowest point. The heights given for the Clowes-hydrogen lamp and the Pieler (alcohol) lamp are for the elongation of the flame due to the gas. The original flame of the Clowes lamp is 0.3 in., while the flame of the Pieler is adjusted so that its tip reaches the top of the shield at a height of 2 in., as marked in the diagram.

Inquiries of General Interest

Safety-First Bulletin

Kindly give the name of the bulletin or paper issued by the Safety-First Organization, which was recently organized in the United States. I have made some inquiries and learn that such a bulletin is published, but I have been unable thus far to discover the name of the paper or where it may be obtained. I understand, also, that the Welfare Department of the U. S. Steel Corporation issues a paper of the same character.

INQUIRER.

Washington, Penn.

There are several publications of this nature issued by different corporations and interests. A bulletin entitled "Safety" is published monthly by the American Museum of Safety, 29 West 39th St., New York City. This bulletin is free to members, but a charge of 15c. per copy is made to others desiring the same.

A publication entitled "Safety Engineering," but known popularly as the "Magazine of Safety," is published by the Safety Press, Inc., 80 Maiden Lane, New York City.

Another publication entitled "Human Engineer" is edited by Winthrop Talbot, M. D., and sold at 25c. per copy, or $1 per year. Address the Human Engineering Co., Sta. B, Cleveland, Ohio.

The U. S. Steel Corporation publishes from time to time a safety bulletin entitled "Standard Requirements for Safety." We understand that this bulletin is issued by the corporation in the interest of its employees, with the purpose in view of increasing their knowledge and appreciation of what is required to secure the greatest degree of safety in the performance of their work. There is, naturally, a limited supply of this publication. It is issued by the Committee on Safety and Welfare, of which C. L. Close, 71 Broadway, New York City, is chairman.

Permissible Mine Lamps

Will you kindly publish in the columns of COAL AGE, as early as possible, a list of the different types of safety lamps and electric lamps that have been approved by the Federal Bureau of Mines for use in coal mines.

INQUIRER.

Dubois, Penn.

The above inquiry was submitted to the Bureau of Mines at Pittsburgh, and the following reply has been received from J. W. Paul, mining engineer in charge of mine-rescue work and appliances, for the bureau. Mr. Paul states as follows:

"In reply to your letter of Feb. 1, permit me to say that the bureau has not as yet established a list of safety lamps approved for use in gaseous mines; but there is now in the hands of the printer a schedule of tests that will be made by the bureau for the purpose of establishing such a list. When this has been printed, which should be within a couple of weeks, copies will be sent to the various lamp manufacturers inviting them to submit lamps for test for determining their permissibility. The tests heretofore conducted on safety lamps were made at the instance of the chief of the Department of Mines of Pennsylvania for his information in approving the lamps for use in the bituminous mines of that state.

"As for portable electric mine lamps, the bureau, about a year ago, adopted a schedule of tests for establishing a list of permissible lamps; and so far has approved three lamps, the Hirsch, Ceag and Wico, as being safe for use in gaseous mines."

J. W. PAUL, Mining Engineer,
Bureau of Mines.

Pittsburgh, Penn.

Extracting Pillars by Machines

Kindly explain the method in use of extracting pillars by machines in coal mining, assuming that the conditions in the seam are favorable to the use of machines.

MINE FOREMAN.

Pittsburgh, Penn.

In extracting pillars by machines, two general plans adapted to different conditions of roof and floor are employed. Where the roof affords sufficient support, the rooms are driven up the usual width of 7 or 8 yd. When this is done, a cut is taken through the pillar at the face, with the machine. This cut is made the same width as the rooms. Having cut through the pillar at the face, a stump 5 or 8 ft. wide is left and another cut made with the machine through the pillar the same width as before. In making these cuts, the coal is loaded out as it is mined, after which the stump 5 or 8 ft. wide is removed with a pick and that coal loaded out. A third cut is then taken through the pillar, the same width as before, leaving a stump 5 or 8 ft. wide, which is removed with the pick after the coal cut by the machine has been loaded out. This process is continued until the entire pillar is removed back to the entry stumps.

Under less favorable conditions of roof and floor, the rooms are driven up narrow, say 4 or 5 yd. in width, leaving pillars between them varying from 10 or 20 yd. to 100 yd. in width. When the rooms have reached the limit, a cut 4 or 5 yd. wide is made with the machine through the pillar at the face; and this being done, the pillar is worked back on the retreating plan, by undercutting the coal with the machine across the entire width of the pillar, and loading out the coal as it falls. In this method one or two rows of posts are set parallel to the face, leaving room only for the machine to work. As each successive cut is made across the pillar and the coal loaded out, a new row of posts is set, after which the row in the rear is drawn, allowing the roof to fall. In this manner, the entire pillar is worked back to the entry stumps.

Examination Questions

Miscellaneous Questions

(Answered by Request)

Ques.—Describe the following methods of haulage: Self-acting incline or gravity plane; electric-motor haulage; rope haulage on slopes; endless-rope haulage and main-and-tail-rope haulage. State where and to what conditions each is best adapted.

Ans.—In a self-acting incline or gravity plane, the arrangement permits the descending loaded car to haul the empty car up the incline. These two cars are connected by a rope that passes over a drum or sheave at the head of the incline, and the movement of the cars is regulated by a brake on the drum.

Electric-motor haulage, as its name implies, is a plan in which electric locomotives are used to haul trips of loaded cars out of the mine, returning with the empty trip.

Rope haulage on slopes is another name for engine-plane haulage. In this plan, the engine is generally located at the head of the plane and draws the trip of loaded cars up the incline by means of a rope to the end of which the cars are attached. The empty trip is then allowed to run back down the slope drawing the rope after it. The descent of the empty trip is regulated by a brake on the drum.

In endless-rope haulage, there is a single rope, which is led from the drum or sheave of the engine into the mine to a tail sheave at the inby end of the haulage road. Passing over this sheave, the rope is returned through the entries to the engine at the mouth of the mine. In this system, the rope is kept continually running and the cars are attached to it by a special friction clutch or by a form of hook that the weight of the car causes to hold the rope fast.

In main-and-tail-rope haulage, there are two ropes. The main rope passes from the engine into the mine where it is attached to the head end of the loaded trip. The tail rope passes from the engine into the mine and over a return or tail sheave at the inby end of the haulage road, after which it is attached to the rear end of the loaded trip. In this manner, the trip is hauled out of the mine by the main rope, dragging the tail rope after it. The ropes are then changed, the tail rope being attached to the head end of the ingoing empty trip, which is thereby drawn into the mine, pulling the main rope after it. The two ropes are attached to separate drums, which are controlled by brakes.

Gravity-plane haulage is adapted to the lowering of loaded cars from a mine opening to the track below. Electric-motor haulage is adapted to the haulage of coal in mines operated by electricity and in moderately flat seams. Engine-plane haulage is adapted to all cases where loaded cars are to be drawn up an incline and the empties lowered, where the weight of the cars and the inclination of the track render gravity-plane haulage unsafe. Endless-rope haulage is generally adapted to large outputs in moderately flat seams. Main-and-tail-rope haulage is better adapted to undulating haulage roads in otherwise flat seams.

Ques.—If an airway is 2000 ft. long and 6x8 ft. in section, the velocity of the current being 500 ft. per min., what is the power producing the circulation?

Ans.—The rubbing surface in this airway is

$$s = 2\ (6 + 8)\ 2000 = 56{,}000\ sq.ft.$$

The power producing this circulation is then,

$$U = k\ s\ v^3 = 0.00000002 \times 56{,}000 \times 500^3 = 140{,}000\ ft.\text{-}lb.\ per\ min.$$

Ques.—Why are accumulations of coal dust dangerous in bituminous mines of this state (Pennsylvania)? What would be your method of eliminating the danger as nearly as practicable?

Ans.—Bituminous coal is frequently highly inflammable and often gaseous. Much of the coal is reduced to fine dust, in working, and this dust floating in the air increases the explosive condition of the mine. The occurrence of a heavy or blownout shot in the vicinity of any considerable accumulation of dust, either on the floor or timbers of the mine, may raise a sufficient cloud of the fine dust to cause an explosion when ignited by the flame of the shot. As far as practicable, all accumulations of dust should be loaded out of the mine. Where it is impossible to remove the danger in this manner, the roof, floor and ribs of the opening as well as the timbers should be thoroughly sprinkled with water for a distance of 20 yd. back from the face before a shot is fired in the place.

Ques.—In an entry that is wet, there is a small amount of marsh gas generated. Under these conditions, what is the greatest percentage of gas in which you would allow blasting to be done?

Ans.—Before a blast is fired, the place should be examined to see that there is no accumulation of gas at the roof or in any cavity or void place. The percentage of gas in the air current passing through the place should be less than 1 per cent. to insure safety. Every precaution should then be taken to avoid a "tight shot," which might give trouble. The coal should be well mined, and a moderate charge of powder used. All holes should be inspected, charged and fired by competent persons.

Ques.—How would you approach a mine fire to insure safety to the workmen and what methods should be employed to extinguish the fire?

Ans.—All workmen should be withdrawn from the return side of the fire. The work of extinguishing the fire should be performed from the intake side. Competent men should be chosen to do the work and only safety lamps should be employed.

The method to be adopted for the extinction of the fire will depend on its character and the headway the fire has gained. In the early stages of a gob fire, the smoldering material may be loaded out to advantage. Water applied to a gob fire will often render the condition worse, unless it is possible to completely drown out the fire. Where gas feeders have been ignited in the waste, it may be possible and necessary to extinguish these by the explosion of a small amount of dynamite in the vicinity.

Coal and Coke News

Washington, D. C.

Experience during the past week is considered to show that the proposed ship-purchase measure now pending in the Senate will either not be adopted at all or will be passed in such a form as will largely limit its effectiveness as a provider of vessel tonnage. Even strong advocates of the bill hardly claim, now, that the prospective measure will help the shipper of heavy freight.

So far as products like coal are concerned, therefore, it is expected they will continue to suffer from the lack and high cost of shipping in the export trade until relief is had through natural means and that consequently the material improvement of conditions in that trade, as affecting the movement of the goods in large quantities is not to be expected in the near future. Evidence submitted during the struggle thus far, however, shows that it is the shippers of the heavier articles, and of coal in particular, that have suffered most severely until now from the insufficiency of tonnage.

The Personnel of the Trade Commission

It is now generally understood that the President has definitely determined upon nearly all the members of his new Trade Commission and that among the men to be named will be, as already reported, Joseph E. Davies, the present Commissioner of Corporations, George T. Record of New Jersey, E. R. Hurley of Chicago, and one or two others whose names appear less certainly fixed. George Foster Peabody of New York, who no doubt could have been named had he himself been willing, has steadily declined to become an active office-holder.

It is understood that, as soon as the new commission is actually constituted, it will be asked by mining interests to look into conditions in the bituminous industry, with a view to determining what, if anything, can be done to bring about the establishment of a limitation of the over-severe competition in certain of the fields under conditions that will be in harmony with the spirit of the new law and of already-existing industrial legislation in general.

There is no indication thus far of the probable outcome of any such effort. Proposals along this line have been made from time to time to congressional committees during the past few years but thus far have had no success.

Annual Session of the U. S. Chamber of Commerce

The annual session of the U. S. Chamber of Commerce came to a close in this city on Feb. 5, after an unusually large and successful meeting at which special attention was given to the shipping situation, and incidentally general business conditions throughout the mining region were touched upon.

The convention, however, refrained from special or particular action as regards the position of any individual branch of business likely to be directly affected by such action or by legislation, except in so far as the usual resolutions of a broad type might indirectly relate thereto. General business and export trade prospects were discussed at the banquet of the convention by the Secretary of Commerce, while other well-known speakers on trade prospects were heard at the several sessions.

HARRISBURG, PENN.

During the past week a bill was introduced in the House by Mr. Bovee, asking for an appropriation for the improvement of the port of Erie by constructing a modern commercial steamboat landing or wharf upon state lands within the harbor, the primary object of which, it is stated, is better facilities for the shipment of ore and coal over the Great Lakes. The coal to this port is carried by the Bessemer & Lake Erie and the Pennsylvania railroads.

The harbor of Erie is the only port in the state on the Great Lakes. Congress has recognized the importance of the preservation and permanent improvement of the harbor of the port at Erie by appropriating large amounts. It is contended that the port is congested by reason of the inadequate wharves and docking facilities for the handling of coarse freights, such as coal and ore.

The state is the owner of the land lying between the foot of Peach St. and the United States Harbor line, a distance of about 560 ft. upon which land a wharf could be built with the consent of the Commonwealth.

The bill asks for an appropriation of $100,000 or so much thereof as may be necessary for the purpose of constructing and building a modern commercial steamboat landing or wharf upon the state lands, and dredging the approaches on both sides of the wharf.

The Governor is empowered to appoint a commission of five persons to have power and authority vested in them to build the wharf.

After the completion of the dock and until the Legislature shall otherwise provide the mayor and council of the City of Erie shall have power to enact ordinances, etc., regulating the manner in which the dock shall be used.

New Examining Boards Are Appointed

New boards of mine inspectors' examiners and mine foremen's examiners were appointed by the county court for Luzerne and Carbon counties on Feb. 5. An entirely new board of mine inspectors' examiners was named and the old board of mine foremen's examiners were renamed, with the exception of two miners in the 10th sub-district, who were replaced by others because they had been promoted to mine foremanships.

The new board of mine inspectors' examiners include E. R. Pettebone, chief engineer of the Delaware and Hudson Co., A. B. Jessup, general manager of the G. B. Markle Co., mining engineers; Patrick Dougherty of Lansford, John J. Hanlan of Avoca and Daniel P. Bolton of Nanticoke as practical miners.

For several years the work of the Mine Inspectors' Examining Board has been a subject of criticism by mine workers and Union officials, some of whom charged that only sufficient candidates were passed to fill vacancies in the several districts.

Last year the court named Messrs. Gallagher, Miles, McEneany, Evans and Dougherty, who held an examination of five candidates last July and forwarded a report to the Department of Mines. The board never heard from the report and has not been paid, its work having been ignored. It was stated at the time that the Chief of the Department of Mines held that no examination was necessary last year as there were no vacancies to be filled in any of the 8 districts.

It is reported that the miners named on the new board were suggested by officials of the United Mine Workers of America so that further criticism of its work will be eliminated.

PENNSYLVANIA

Anthracite

Summit Hill—The mine fire which has been burning here for the last 62 years and which was believed to have been conquered, has broken out afresh. During the time that this fire has been in progress, coal estimated to be worth millions of dollars has been burned, and great expense has been incurred by the Lehigh Coal and Navigation Co. in fighting this fire. The task of extinguishing it seems hopeless.

Taylor—Several hundred men working in the breaker at the Sloan colliery of the D., L .& W. Coal Co. fortunately escaped injury and possible death on Feb. 6, when two sticks of dynamite, unloaded from a car of coal, passed through the rolls and exploded. The explosion shook the building and put the rolls out of commission. Sixteen hundred hands employed in and about the colliery were sent home for the day.

Kingston—Notice has been served by the Delaware, Lackawanna & Western Coal Co. upon its foremen, driver bosses and others who have charge of employees that hereafter they must not enter saloons. This move on the part of the company is in keeping with the "safety first" movement in the operation of its collieries. The notice to the bosses states that they are expected to set an example for the men, and that any one who violates the company orders and enters a saloon does so at the risk of losing his job.

Plymouth—After lying dormant for several weeks, negotiations for the purchase by the Kingston Coal Co., of the Dodson Colliery, of the Plymouth Coal Co., have been reopened, and prospects of the deal going through are said to be good. Because of litigation over mine caves between Plymouth Borough and the Plymouth Coal Co., the colliery has not been operated for the last 8 months.

Harleigh—Several hundred employees at the No. 7 colliery of the G. B. Markle Coal Co., who have been idle for several weeks following the destruction of the breaker by fire, are now being given employment at night as at that time the coal from another mine will be prepared at the Harleigh breaker.

Bituminous

Pittsburgh—Two steamers of the Monongahela River Consolidated Coal and Coke Co., the "Sam Clarke" and the "Alice Brown" left Feb. 5 with 490,000 bushels of coal for southern points. Other steamers are expected to leave soon.

Charleroi—January was the best coal month since October, although not an especially good one, in shipments through Lock No. 4. The coal sent down stream during this period amounted to 13,919,000 bushels. Bad weather interfered but slightly with shipments in January, and navigation was only closed for 124 hours during the month.

Connellsville—The H. C. Frick Coke Co. recently lighted 1500 additional coke ovens lying in Fayette and Westmoreland Counties. This order will furnish work for 1500 men, and increase operations of the company from approximately 42 to 60 per cent. A week earlier 1000 ovens were lighted, making 2500 ovens in all.

Windber—The mines of the Berwind White Coal Mining Co. have been working five days a week since the beginning of the year, the longest period they have been continuously operated since the last of July. The company has obviously found a new market for its fuel, or at least a market for the tonnage formerly delivered to the North German Lloyd Steamship Co. before its fleet of vessels was driven from the Atlantic immediately following the outbreak of the war. There is a constantly expanding market for the smokeless coal of this section, due to legal enactment by the more populous centers against smoke producing fuels.

Johnstown—Thomas A. Edison is now constructing a plant in this city costing about $25,000 to $30,000. Mr. Edison and the Cambria Steel Co. have closed a contract whereby Mr. Edison can build his plant on the Cambria Steel property and extract benzol from the coke gas that arises from the nine different batteries of ovens of the company. When completed, it is believed, the byproduct of the Cambria ovens will amount to from 1500 to 1800 gallons a day. It is expected the plant will be ready to start about Mar. 1.

Uniontown—Receivers for the Tower Hill-Connellsville Coke Co. on Feb. 5 filed a petition in court asking permission to insure the fulfilling of a large contract with the Youngstown Sheet & Tube Co. In the petition it is stated that the receivers have entered into a contract to furnish 16,000 tons of coke per month to the Youngstown corporation for one year. The contract price is $1.75 a ton, slightly below the figures quoted in the market, but it is claimed this will permit the operation of the plant at a profit.

WEST VIRGINIA

Grafton—John T. McGraw, of Grafton, is reported to be negotiating with New York interests for the sale of 65,000 acres of valuable coal lands in this section, at a figure running into the millions. The property will be reached by the West Virginia Midland R.R., which is to be standard-gaged, and will be developed at once, if the deal goes through. The B. & O. which is interested in the road, is said to be backing the proposed extension and improvement.

Charleston—Conditions in the coal industry of the New River district has improved much in the last 30 days. January showed a 25 per cent. increase over December, and there has been marked improvement in the coal trade generally since the first of the year.

The judiciary committee of the house of delegates recently met and decided to report unfavorably upon the House Joint Resolution No. 5 pertaining to the classification of property for taxes. This is the measure which contemplated the taxation of coal, oil and gas production which has been causing much comment.

Bluefield—A plan of reorganization of the Big Vein Pocahontas Coal Co. has been prepared by the Committee in charge and a new firm which will succeed the old one and operate the properties involved will be organized. This new company will be incorporated under the laws of West Virginia with an authorized capital stock of $1,800,000, and will also have authority to issue $350,000 of five year, 6 per cent. convertible bonds. The Fidelity Trust Co., of Baltimore will be the trustee for the bonds, which will be dated Jan. 15, 1915.

Boomer—It is reported that the mines in this vicinity will go on full time with full force shortly, as there has been a marked improvement in the work of the mines recently. Considerable coal is now being loaded for Lake trade in anticipation of the opening of navigation.

ALABAMA

Birmingham—Investigation into the probable coal supply along the Warrior River shows approximately 670,000,000 tons of available coal. This investigation was made by W. E. Leake, a well known operator and engineer. The report made by Mr. Leake considers each section of the coal-bearing field along the Warrior River and contigious thereto that is within easy access of the stream. It is figured that this coal can be barged to Mobile for from 30 to 50c. per ton as against the present all-rail rate of $1.10, and as the quality of the coal in the Warrior River district is of the best, the tonnage moved should be large.

The semiannual examinations for first- and second-class mine foremen's and for fireboss' certificates was recently held by C. H. Nesbitt, chief mine inspector, and his board of examiners. Twenty-nine applicants presented themselves for examination.

KENTUCKY

Whitesburg—Representatives of the big coal companies in Letcher County have gone before the Board of Tax Supervisors to protest against increases in assessments of their properties, which have run in the aggregate to $1,000,000. These increases include the following: Consolidation Coal Co., $124,000; Mineral Fuel Co., $100,000; Swift Coal & Timber Co., $100,000; Mineral Development Co., $60,000.

Jackson—The Davis Coal Co.'s mines near here, after a month's shutdown, have been reopened and full time operations will soon be in order.

St. Charles—It is understood that the Carbondale mine near here, which has been shut down for several months, will resume soon. It gives employment to 150 men, most of whom have been idle during the term of suspension.

Richmond—The property of the Big Hill Coal Co., in Bell County, was sold by John C. Chenault, receiver, to H. B. Hanger, of Richmond, who in turn sold the property to the Caney Creek Coal Co., of Chattanooga, Tenn. S. F. Rock, who was superintendent of the mines, has resigned and returned to his home here.

Frankfort—Bell County has been selected by the State Board of Health and the Rockefeller Foundation for an experiment in intensive community work and a mining camp near Middlesboro, yet to be selected, it is understood, will be developed into conditions approximately ideal from a sanitary and hygienic standpoint. A sanitary engineer and two nurses will be paid by the Foundation during the experiment and the nurses will be chosen by the Kentucky Tuberculosis Commission. The mine owners and operators of the state are taking much interest in the experiment.

OHIO

Columbus—The chances for the establishment of standard preparations of bituminous coal in the states of Ohio, Pennsylvania, West Virginia, Indiana, Illinois and Kentucky are not as bright as formerly, according to the statement of those interested in the movement. Considerable opposition to the plan of making 1¼-in. lump only has arisen and the doubt arises if such a rule can be enforced in case it is adopted. But the plans for holding a general conference of committees representing the above mentioned states has not been abandoned and every effort will be made to bring about standardization of sizes.

Prominent coal men in Ohio are making an effort to have one of the experimental stations on mining, authorized by congress, located in Columbus.

Senator Gallagher recently announced that he would offer a bill to amend the Green run-of-mine law by which amendment operators and miners would be permitted to enter into contract for mining coal in any manner and at any price. If they are unable to reach an agreement, however, the run of mine plan must prevail.

INDIANA

Indianapolis—Among the bills introduced in the Indiana Legislature now in session is one providing that the operators shall pay for shot-firing; another aims to prohibit strip-mining and a third provides for the codification of the mining laws of the state.

ILLINOIS

Murphyboro—Several days of heavy rain fall and back water from the Big Muddy River recently caused a suspension at the large No. 9 mine of the Big Muddy Coal & Iron Co., on account of several dangerous cave-ins.

Tilden—The Crystal mine has suspended operations here on account of a disastrous cave-in in the air shaft. Fortunately, no one was injured at the time, and if rainy weather ceases, the plant will be in shape to operate again in a short time.

The mine of the Bessemer Coal & Mining Co. here has suspended operations indefinitely. The cause given is lack of business at a profitable figure.

Cambria—The Carterville & Big Muddy mine has been taken over by a company of men headed by Rudolph Specker, a brewer of Murphysboro, who are bondholders to the extent of about $30,000. The mine has been shut down indefinitely.

East St. Louis—Although freight rates have gone up, effective Feb. 1, on coal from the southern Illinois fields to St. Louis, Mo., the rates from the same fields to East St. Louis will not go into effect until the Illinois State Utilities Commission has made an investigation. The hearing has been set in Springfield, Illinois, for Feb. 16. The rate which was to go into effect on the first was an advance of 5½c. a ton. This would make the East St. Louis local rate 37½c. a ton. It is likely that the rate will remain 32c., however, inasmuch as the manufacturing industries in East St. Louis and adjoining cities have been built up with the express understanding that their coal supply was to come in on the low rate.

Springfield—Judge Creighton, in the Sangamon County Circuit Court, on Feb. 4 refused to grant a temporary writ of injunction brought by Samuel H. Putnam, of Chicago, a bondholder of the defunct Illinois Collieries Co. to restrain the Pittsburgh Coal Co. from selling the property of the Collieries company.

IOWA

Des Moines—Coal operators of the state have decided to take no action on the Clarkson State Insurance Bill as the opinion of 50 operators present at a meeting of the Iowa Coal Operators Association was divided regarding the merits of the measure which provides for a State Insurance Fund. No stand was therefore taken, and no resolution passed regarding the proposed measure. This will be left to members of the executive committee.

FOREIGN NEWS

Paris, France—With winter weather of unusual severity prevailing, France faces a coal famine because the Germans hold the territory from which most of the fuel is obtained in normal times. It is estimated that the present monthly demand is 4,000,000 tons more than is produced, which makes it necessary to draw upon reserve supplies, and to use wood for fuel.

PERSONALS

Stephen B. Sexton, president of the East St. Louis Real Estate Exchange, and head of the firm of Sexton & Son, has been elected a member of the Board of Directors of the Southern Coal & Mining Co.

Osborne Mitchell has been appointed general counsel for the Petroleum Iron Works, Pennsylvania Tank Car Co., The Pennsylvania Tank Line, and the Pressed Steel Products Co. His office will be in the Wick Building, Columbus, Ohio, after Feb. 15. The corporations above named are strongly interested in safety and welfare work, and Mr. Mitchell's duties will entail extensive investigations in this field.

OBITUARY

Henry Harrison Harvey, pioneer coal operator, and prominent in industrial circles throughout the Wyoming Valley, died at Wilkes-Barre, Penn., Feb. 4, from heart trouble. For years he was superintendent of the Harvey Mines at West Nanticoke. Since his retirement as a coal operator he has been identified with many movements of enterprise, and has sought to develop the community.

Charles P. McCafferty, owner and manager of the Monarch mine at East Brady, Penn., in the Allegheny Valley, died at his home on Feb. 2, of apoplexy, leaving a wife and two daughters. He had been the president of the Allegheny Valley Operators' Association since it was organized several years ago and was highly esteemed on account of his excellent character and his charitable disposition. He was born in Fairview, Butler County, Penn., in 1848.

F. M. Lechner, aged 78, a well known inventor of Columbus and the originator of the first successful mining machine, died suddenly last week of apoplexy. His first patent on mining machinery was granted in 1877. He later organized and became president of the Lechner Mining Machine & Manufacturing Co. J. A. Jeffrey soon afterwards purchased the business and patents and then organized the Jeffrey Mfg. Co. Mr. Lechner retained stock in the new company and represented it in Europe for about 10 years. He leaves two sons.

CONSTRUCTION NEWS

Hazleton, Penn.—Plans are being prepared by the G. B. Markle Co. for the rebuilding of the Highland Breaker at a cost of approximately $200,000.

Youngstown, Ohio—The erection of a battery of coke ovens capable of producing 50,000 tons monthly and of a finishing mill with a capacity of 25,000 tons per month, is planned by the Youngstown Sheet and Tube Co. The construction of the coke ovens has been positively decided upon, while the exact nature of the finishing mill remains yet to be determined. An outlay of more than $6,000,000 will be required to carry the plan through.

Great Falls, Mont.—The Roberts & Schaffer Co., of Chicago, has been awarded the contract by the Cottonwood Coal Co., for a complete fireproof coal tipple and washing plant to be erected at the mine at Lehigh, Mont. The tipple will have a capacity of 3500 tons per day and will be built to accommodate self dumping cages and mine skips. It is to be equipped with modern coal screening and picking facilities, driven by electric motors throughout. The washery will have a capacity of 2000 tons daily. It will be built of reinforced concrete and steel, and will be equipped with facilities for coal drying. It also will be electrically operated.

Wendell, W. Va.—The Maryland Coal Co., with headquarters at No. 1 Broadway, N. Y. City, is remodelling its tipple located at the mine at Wendell, W. Va., to a considerable extent in order to double the capacity. The latest machinery, dumps, chain hauls, etc. will be installed. The general contract has been let to Arthur S. West, 15 East Fayette St., Baltimore, Md. He in turn has let a contract to the Canton Lumber Co. of Baltimore for the supply of lumber, to the Eastern Railway Supply Co. American Bldg., Baltimore, for hardware, nails, etc., and to the Stockdale Machine & Foundry Co., for the equipment. The total expenditure will be $40,000.

Pittsburgh, Penn.—As the House of Representatives has reported favorably the sum of $300,000 for the Bureau of Mines, it is expected that the preliminary work on the new buildings to be erected on the Magee site adjoining Schenley Park and the Carnegie Institute of Technology, will be begun about Mar. 15. There is available $150,000 for the preparation of the foundations and other work. The structure complete, including necessary apparatus, will cost $500,000. A second appropriation authorizes the creation of 10 new substations of the Bureau which will be situated at various convenient points throughout the country with one in Alaska. There are now six sub-stations and eight mine rescue cars. The number of cars is to be increased to 23. The administration of these sub-stations and the mine rescue cars will be from the headquarters of the Bureau of Mines in Pittsburgh as at present.

NEW INCORPORATIONS

Hopkinsville, Ky.—The Southern Coal Co. has filed articles of incorporation, with a capital of $50,000. Thomas P. Cook, O. F. Tutt and T. L. Evans are the incorporators.

Middlesboro, Ky.—The Wasioto & Black Mountain R.R. Co. has filed an amendment to its articles of incorporation, increasing the limit of its indebtedness to $10,000,000.

Newport, Ky.—The Logan & Kanawha Coal Co., with $25,000 capital, has been incorporated here, having been organized by Fred Legg, F. A. Walker, Howard Benton and others.

New Waterford, Ohio—The New Waterford Mining Co. has been incorporated with a capital of $50,000 to mine and sell coal by F. F. Leuk, A. P. Mullins, J. E. Morgret, R. D. Anderson and D. A. Warner.

Chattanooga, Tenn.—The Old Virginia Coal Co. has filed applications for a charter, listing its capital at $50,000. The incorporators are J. R. Barnes, W. L. Lawton, H. B. Bonney, C. W. Lusk and W. B. Miller.

INDUSTRIAL NEWS

Whitesburg, Ky.—It is alleged that the Roberta Coal Co. will build a mining plant near here.

Columbus, Ohio—The announcement is made by the executive committee of the Michigan-Ohio-Indiana Coal Association that the annual meeting will be held at Cedar Point during the week of June 20, possibly the 22, 23 and 24.

Hinton, W. Va.—Shipments of coke over the Chesapeake & Ohio for the last two years show a decreased tonnage for 1914 of 65,577 tons, or over 18 per cent. During 1913, 361,535 tons were shipped, while in 1914, 294,598 tons were moved.

Columbus, Ohio—At the instance of Mayor Karb of Columbus a committee has been appointed to receive donations of food and clothing to be shipped to miners and their families at Rendville, Perry County, where suffering has been acute.

Wellsville, N. Y.—The Kerr Turbine Co. has appointed W. E. Storey as its Toronto, Can. representative, with offices in the Kent Building. Mr. Storey was formerly identified with the Under-Feed Stoker Co., and more recently with the Goulds Mfg. Co.

Duluth, Minn.—During the year 1914 almost a quarter of a million cars of coal and coke were shipped from the docks on the St. Louis Bay water front. During the year 248,845 cars were shipped. This compares with 257,283 cars in 1913, and 276,384 cars in 1912.

Buffalo, N. Y.—There is prospect of a duty on anthracite coal and coke imported into Canada, as the country needs more revenue to meet war expenses. About 20c. a ton is proposed. The present duty on bituminous sizes is 53c. a ton and on slack, 13 cents.

Huntington, W. Va.—Another of the large coal interests of the New River field is preparing to open offices in Huntington. W. H. Deegans, who controls eight companies and as many operations in Fayette County, has leased quarters in the First National Bank Building. From these offices will be conducted the sales department of the business.

Birmingham, Ala.—The Pratt Consolidated Coal Co. is constructing an electric tram line from its Maxine Mine to a point on the Warrior River, where the back water from Lock 17 will touch. This is being done to facilitate the movement of the coal down the Warrior when Lock 17 will have been completed, which is now a matter of only a short time.

Bluefield, W. Va.—S. H. Meem and R. S. Haskins, of Bluefield, who lately leased coal land in the Perry County field near Hazard, Ky., will soon start development work. The property lies on the Lexington & Eastern branch of the Louisville & Nashville Ry., and in a section being rapidly developed. A dozen or more coal-mining plants are in close proximity.

Birmingham, Ala.—Inquiries are coming to the coal operators here from Greece and other foreign countries for coal, Greece being willing to take 50,000 tons if it could be delivered in reasonable time. The lack of bottoms will be a great hinderance. Italy's and Sweden's former source of supply has been cut off and these countries are anxious to get Alabama fuel.

Fayetteville, W. Va.—An embargo was recently placed on eastern shipments from the New River region, resulting in a stagnation of coal movement. This measure was adopted on account of the congestion of the coal traffic at tidewater. Several thousand cars are now awaiting movement. It is expected that the embargo will be raised in a short time and shipments resumed.

Columbus, Ohio—According to the financial statement of the Hocking Valley Ry. Co. for the month of December, there is a heavy falling off in operating earnings compared with the corresponding month in 1913. The revenues during December, 1914 were $414,791 a decrease of 28 per cent. from December, 1913 when they were $574,411. The heaviest decline was in freight revenues.

Bristol, Tenn.-Va.—An appreciably increased coal tonnage is moving South from this section and has been since the first of the year, an indication that Southern industrial conditions have been much improved. The Virginia fields have suffered sharply on account of the stagnation of the cotton market but the coal operators believe the worst is now over and that business will rapidly improve.

Washington, D. C.—The Interstate Commerce Commission on Feb. 5 denied the petition of the Illinois coal operators who sought to bring about a regrouping of mines in the state for rate-making purposes. The operators particularly sought to decrease the so called Springfield group, and alleged that application of the same rates to northwestern points of shipment from all mines in that group was unjust.

Cincinnati, Ohio—High water on the Ohio River, which brought down quantities of driftwood, nearly caused the loss of several coal barges of the Marmet Coal Co. recently. Eight loaded and six empty barges broke away when struck by a large amount of driftwood, and floated some distance down the river, but were all caught by pursuing steamers and tugs. Several men narrowly escaped drowning in the mixup.

Pittsburgh, Penn.—Extensive coal land purchases in Washington County are being hinted at by Pittsburgh brokers, specializing in this class of property. Offers to buy tracts of coal have been given brokers, and they report having spent much time with owners of such land. The volume of inquiries is large, and the prices offered are said to be fair, and it would not be surprising to see considerable land change hands.

Philadelphia, Penn.—The suit in the United States Circuit Court of Appeals of the Pittsburgh-Buffalo Co. against the American Fidelity Co., a surety corporation, ended Feb. 4 with an opinion by Judge Victor B. Woolley, reversing the Western District Court and ordering a new trial. The case involves a claim of about $12,000. The claim was for alleged breach of contract on the part of J. J. Dimmick & Co. on refusing to take further orders of coal.

Columbus, Ohio—Charles H. Boardman, president of the Murray City Coal Co. and treasurer of the Tidewater Coal & Coke Co., with offices in the Wheeler Bldg., Columbus, has filed a petition in bankruptcy in the United States Court with liabilities of $357,101.39 and assets of $3138. Included in the liabilities are notes and accounts due to the Union National Bank, which has been liquidated amounting to $122,000. Of his liabilities, $259,850 are secured.

Des Moines, Ia.—The sale of Indiana coal to tile plants in Iowa, which has been of considerable magnitude in past years, is lessening because of the inroads of southern Illinois coals. The selling of Iowa domestic coal at home is also decreasing because of the competition of Franklin County fuel and Eastern splints. The production of Iowa coal is gradually becoming less, and authorities estimate that 25 years will see the exhaustion of the present known Iowa coal fields.

Knoxville, Tenn.—More than 100 coal operators and representatives of mining interests in east Tennessee and southeastern Kentucky were present at the recent session of the Southern Appalachian Coal Operators' Association's convention. Col. James R. Wooldridge, of Wooldridge, Tenn., was elected president, succeeding E. C. Mahan, and James E. McCoy was reëlected secretary. Mr. Mahan served for two terms and declined a third. The Commercial Club was host to the visitors at a luncheon and the annual banquet was held in the evening, with President-elect Wooldridge as toastmaster.

Birmingham, Ala.—The Alabama operators, through the Alabama Coal Operators' Association, has petitioned the Interstate Commerce Commission to have the rates on coal to various Mississippi Valley points reduced. They claim that although the haul from the Illinois and Kentucky field is practically twice as long as from Alabama, that these districts have a freight rate to the common points of only about 15 to 20c. per ton higher than from the Alabama fields, and to practically all of the smaller points the same rate as Alabama. They claim that this is discrimination and that the rates should be adjusted.

Chicago, Ill.—It is apparent that the stealing of coal during the winter months in the Middle Western States, which has been a considerable problem to the carriers and retail dealers in past years, has decreased greatly thus far this season. The railroads are policing shipments while in transit much more rigorously than before; and appear to surround shipments of coal with better protection, and show a disposition to coöperate more with the retailers to prevent losses from this source. It is also noticeable that the carriers show greater willingness to pay claims for loss and damage to coal while in transit than in the past.

Coal Trade Reviews

General Review

January anthracite shipments the lowest in years and prices becoming heavy. Ocean freights the ruling factor in off-shore bituminous. No definite indications of any improvement. Middle Western markets demoralized.

The extremely flat conditions in the anthracite trade are reflected in the official statement of January shipments, which show the smallest movement for that month in years. In spite of the constantly recurring cold snaps, buying is not stimultaed, and the outlook for the current month is even more discouraging. With the exception of a fairly persistent call for some of the smaller steam sizes, there is practically no demand in any direction. Prices are naturally under a heavy pressure, and the April circular is being quoted on the domestic grades.

The chaotic situation in ocean freights continues to be the predominating feature on the Atlantic Seaboard. However, it is clear that some of the larger interests believe they have the freights well in hand as is evidenced by the closing of a number of contracts at a very slight advance over last year's figures. As a result of the steady increase in export freights on other commodities, no coal charters are reported, and the acuteness of the situation is shown by the purchase of two large Lake carriers for use in the Coastwise trade.

Spot prices on the West Virginia grades have hardened up slightly at Down East points, and it is generally agreed that the high-grade Pennsylvania coals will very probably make large inroads on the Hampton Roads grades in those markets. In the other Eastern sections there seems to be a disposition among buyers to increase their purchases very slightly, and there are indefinite indications of an improved undercurrent, but the situation in the main shows little of a real encouraging nature.

A very modest increase in the manufacturing demand in the Pittsburgh district, supplemented by a broader domestic demand, as a result of the colder weather, has created a more hopeful spirit, but on the other hand buyers are confident that they will be able to negotiate new contracts at a reduction over last year's figures. But it is clear that the recent effort to stimulate an artificial activity with sanguine reports of different kinds, has collapsed. There has been a reaction in the Ohio trade as a result of the mild weather and continued industrial depression, and the market has been forced down to new low levels. Stocks in the hands of the retailers appear larger, though the floods are interrupting shipments to some extent.

The demand has practically ceased entirely in the Middle Western market, prices have softened, some demurrage coal is already noted at the principal distributing centers, and reports indicate that there is a large tonnage of consignment coal en route in all directions. The trade is clearly distressed to absorb the large surpluses accumulating, and shippers on the open market are having an extremely hard time with nothing encouraging in sight unless it be a continued spell of exceedigIny low temperatures.

ATLANTIC SEABOARD

BOSTON

Hampton Roads coals unchanged as to price f.o.b. but situation begins to clear up. Georges Creek and the Pennsylvania grades await developments. Water freights are easy at the advanced rate. Anthracite has again relapsed into dullness.

Bituminous—The situation on Pocahontas and New River shows signs of settling down. The high water freights have caused some apprehension, especially to consumers directly on Tidewater but now it appears that interests that control their own transportation have made a smaller advance over last year's prices than was looked for. In some cases yearly contracts have been closed at only 7c. up from last year's opening on cars at Providence, Boston, and similar points. A quiet canvass continues on the part of such shippers and a fair amount of business is being entered up.

There is no change in prices fo..b. Hampton Roads. The demand is only scattering and there is still plenty of coal standing at all the piers. The spot market at Boston and Providence for distribution inland is slightly improved. Prices have hardened a little, showing the influence of higher water freights.

The on-car basis for season contracts at Boston points seems to be $3.85@3.90, the former being the price to the closer buyers; $3.85 analyzes into $2.85 f.o.b., at 77c. water freights, and 23c. for discharging, weighing, and insurance. This shows how willing some shippers are to discount the freight market.

The Georges Creek shippers are confining themselves to filling expiring contracts. There is little heard from them with regard to season prices alongside and it is assumed they are waiting until their Southern competitors have settled down into some consistent policy. All-rail and f.o.b. they are following the lines of 1914.

Shippers of the Pennsylvania grades are showing an active interest in the market at Tidewater as well as all-rail. The difference in rates between anthracite transportation and bottoms on the open market makes the New England trade look attractive and it is probable that receipts this year from Philadelphia will be materially increased. There is nothing definite as yet to be reported but it is likely that some of the high grade Cambrias and Somersets will make inroads on West Virginia's usual tonnage in this market. There is no spot market worth mention but there is quite a little inquiry for contract.

Water Freights are easy at $1, Hampton Roads to Boston, all kinds of transportation, the demand being extremely quiet. By some this rate is regarded as artificial, there is so much tonnage offering, but so far that basis is being firmly maintained. Two steamers have lately been bought to come from off the Lakes and this will help out the supply of bottoms along the coast.

Anthracite showed a mild spurt for a few days. The low temperatures were not sustained, however, and inquiry has again fallen off.

Prices on bituminous are quoted about as follows:

	Clearfields	Cambrias Somersets	Georges Creek	Pocahontas New River
Mines*.....	$0.90@1.50	$1.15@1.65	$1.67@1.77	
Philadelphia*.....	2.15@2.75	2.40@2.90	2.92@3.02	
New York*.....	2.45@3.05	2.70@3.20	3.22@3.32	
Baltimore*.....	.....	.....	2.85@2.95	
Hampton Roads*.	.....	.....	.....	$2.70@2.75
Boston†.....	.....	.....	.....	3.85@3.95
Providence†.....	.....	.....	.....	3.80@3.90

* F.o.b. †On cars.

NEW YORK

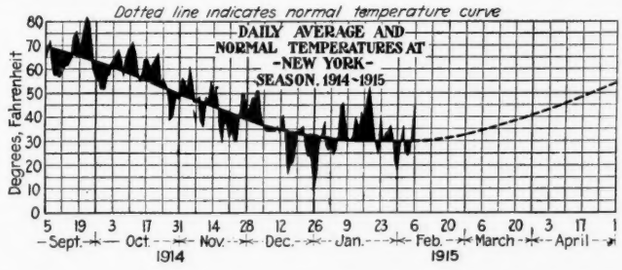
More bituminous on consignment and numerous embargoes in effect. Heavy restriction in the anthracite regions and market in the worst condition for a long time. Fair demand for steam grades.

Bituminous—The soft coal situation has shown no material change during the past week. There is possibly more free coal at the piers, but so far this has had no material effect upon prices. Numerous embargoes are in effect to South Amboy and open-market sales are much limited. Contract requirements are about the same as they have been for some time past. Mines producing the best grades are working 80 to 100%, while those mining the poorer qualities are working anywhere from one to four days weekly.

There is considerable interest being taken on the part of the New England middle houses over the Coastwise vessel situation. There has been no change in vessel rates but shipments for Hampton Roads to Boston and other New England ports are being restricted by reason of the shortage in transportation; $1 has been paid in numerous cases. Brokers are asking $1.10, but we have not heard as yet of any case where this has been paid. The middle houses in New England are showing an inclination to keep in close touch with Pennsylvania shippers and a few sales of Pennsylvania coals have been made to take the place of Southern coals. This has not as yet affected the market but there is still hope on the part of many, and an expectation on the part of most,

that further business will develop within the near future, increasing the demand for the Pennsylvania product. The market is quotable as follows: West Virginia steam, $2.35@2.55; fair grades, Pennsylvania, $2.55@2.65; good grades of Pennsylvania, $2.70@2.80; best Miller Pennsylvania, $3.10@3.15; Georges Creek, $3.15@3.25.

Anthracite—The hard-coal trade is in worse condition for this period of the year than it has been for a long time. The whole anthracite region is restricting to from two to three days per week, the retail demand is extremely light and dealers have most of their equipment tied up for lack of business.



Broken coal, in the harder grades particularly, is short in supply and active in demand, due principally to the restriction. Egg coal, both hard and free burning, is the best size according to demand. Stove and chestnut sizes, in both hard and free burning grades, are a great drug. Prices on all of the prepared sizes vary all the way from the April to the winter circular. Individual coals in odd lots are to be had at material concessions. Company coals are held firm at the prevailing circular.

The steam sizes are in better condition, so far as prices are concerned, due to the restriction. Pea coal is steady at the circular and easy as to supply and demand. Buckwheat, rice and barley, particularly in the better grades, are short and are held firm. The poorer grades are sold at some concession but prices are much better than usual during periods of full-time work at the mines. The steam size situation is generally satisfactory.

The market is quotable as follows:

	Upper Ports		Lower Ports	
	Circular	Individual	Circular	Individual
Broken	$5.10	$4.60@5.10	$5.05	$4.55@5.05
Egg	5.35	4.85@5.35	5.30	4.80@5.30
Stove	5.35	5.10@5.35	5.30	5.00@5.30
Chestnut	5.60	5.30@5.60	5.55	5.25@5.55
Pea	3.55	3.45@3.55	3.50	3.35@3.50
Buckwheat	2.80	2.60@2.80	2.50@2.75	2.35@2.75
Rice	2.30	2.20@2.30	2.00@2.25	1.75@2.25
Barley	1.80	1.70@1.80	1.75	1.47@1.55

BUFFALO

Consumers apparently have all the coal they need and excess stocks are becoming apparent. Loading into Lake vessels and curtailing of mine operations. Slack generally scarce.

Bituminous—Many of the trade no longer report any new leads, while consumers have large stocks and are not using their coal rapidly. On the other hand there are some who now look for a genuine stir before long. There has been much effort to create an artificial activity by sanguine predictions but that plan has failed. There is a scarcity of slack at the moment, due to the slow sale of three-quarter but the price has not improved and is not expected to right away. The demand for sizes has not changed much, except that mine-run has profited some on account of the light supply of slack. Certain shippers report renewals of contracts at old figures though they are careful not to say what these figures are.

There is no change in the prices of bituminous, all quotations being on the basis of $2.80 for best Pittsburgh lump, $2.70 for three-quarter, $2.55 for mine-run and $2.15 for slack, with Allegheny Valley sizes 25c. lower than Pittsburgh.

Anthracite—Retailers appear to be satisfied with their sales, and they look for a further increase before the turn of winter. But the shippers are not so well satisfied; some of the leading mines have been shut down two or three days a week and others are piling up surpluses, either in Lake vessels here or in storage depots. The line business is quiet and promises to remain so. The heavy storm of last week tied up deliveries four or five days, but the consumer was not disturbed.

The Lake cargoes held here now embrace more than 150,000 tons and more than one company has taken tonnage for early loading. Reports from the Northwestern trade agree that there is a good tonnage moving, but that there will be a good surplus left over when spring opens.

PHILADELPHIA

Anthracite gives no indication of improvement. Rigid curtailment still in effect. Bituminous continues sluggish, with demand and prices at low ebb.

Anthracite—The past month has been the poorest experienced in this vicinity for the last fifteen or twenty years. The open weather, combined with certain economic conditions, reduced the demand to practically nothing, and the prospects for the current month are equally unfavorable. Outside of a call for buckwheat and rice, for which the demand is in excess of the production during a curtailment, the market is inert. Dealers appear to have sufficient stocks to carry them over until the opening prices on the first of April; that is, providing no unusual weather conditions prevail. There is no difficulty at the present time in securing almost any domestic size at, or near, the April circular. Egg seems to be in better call than either stove or nut, reflecting a condition which usually prevails at this season.

There is a general feeling in the trade that there is not likely to be much if any change in current conditions. Dealers are buying only where necessary to fill gaps in their stocks, and jockeying their supplies so as to carry over as small a tonnage as possible into April.

Prices at Tidewater rule about as follows:

	Circular	Individuals
Broken	$4.75	$4.50
Egg	5.00	5.00
Stove	5.00	5.00
Chestnut	5.25	4.80@4.90

Bituminous—There seems to be little or no indication of improvement in the bituminous situation. Outside of a slightly increased activity at Tidewater, the market continues lifeless and without feature. Considerable coal is moving from Tidewater, mostly Georges Creek, but the line trade is almost at a standstill insofar as new business is concerned. Continuous soliciting nets poor results, and the future hold out little hopes for an improvement either in demand or prices. Prices are on about a parity with the previous week, ranging from 90c. to $1 for medium grades, and 25 to 30c. higher for the better qualities.

BALTIMORE

Inquiries are more numerous, though for small lots. Export business picking up again. Colder weather aids the hard-coal business.

A number of small inquiries have appeared in the local market, and while the tendency to buy in small lots has not been generally overcome there is more of a disposition to close for larger tonnages than has been evident for some weeks past.

Colder weather is helping the anthracite business and small-order trade is especially active. Deliveries from mines to terminals have been comparatively easy, although much of the coal has arrived here in a badly frozen condition.

The foreign business is again showing evidence of a revival. Charters announced here the past week included the following: Steamer "Gothard," to Italy; schooner "D. H. Rivers," to San Juan; steamer "Rio Parahy," to Genoa; steamer "Hova," to Savona; steamer "Signe," to Havana; and steamer "Hopemoor," to Alexandria.

An interesting announcement was made to the trade in a new interstate commerce schedule which places an additional tax of $2 for every car reconsigned while en route on the railroads centering here. Heretofore this has always been done by the roads free of cost.

HAMPTON ROADS

Movement over the piers light. January tonnage larger than December but somewhat smaller than expected.

Dumpings over the piers at Hampton Roads have not shown up well. The Coastwise movement has only been about fair while export cargoes have been few and small. With the exception of two cargoes the entire export movement went forward in schooners.

During the month of January there was shipped from Hampton Roads 886,535 tons of which the Norfolk & Western dumped 401,427 tons, the Virginian Ry. 247,433 tons and the Chesapeake & Ohio 237,675 tons. These figures show an improvement over the December dumpings by over 50,000 tons but it was expected the January tonnage would show up much heavier.

Recent clearances have been noted as follows:

Vessel	Destination	Vessel	Destination
Eagle Wing	St. George	Calumet	Para
Elizabeth Gilbert	Puerto Cabello	**Merity**	Rio de Janeiro,
Eleanor F. Bartlim	Rio de Janeiro,	**Sif**	Unknown
Frances M.	Rio de Janeiro		

Note:—Schooners are noted in **bold face** type.

OCEAN FREIGHTS

Freights still advancing. Very few export charters.

Since our last report the market has again advanced to new high levels, owing to the increased demand for steamers for grain, cotton, etc. Very few charters have been completed for export coal and none of these reported.

The market is still hardly quotable, but approximate steamer prices on coal may be take nas follows:

To	Rate	To	Rate
Havana	**$2.75**	Guantanamo	**$3.25**
Cardenas or Sagua	3.25@3.50	Demerara	**5.50**
Cienfuegos	**3.25**	Bermuda	3.75@4.25
Port of Spain, Trinidad	3.00@3.50	Vera Cruz	3.25@3.50
St. Lucia	3.00@3.50	Tampico	3.25@3.50
St. Thomas	3.00@3.25	Rio	**9.60**
Barbados	3.00@3.50	Montevideo, Buenos Aires or La Plata	**8.88**
Kingston	**3.25**	Mediterranean	9.60@10.80
Curacao	**3.00**	Valparaiso	**7.20**
Santiago	**3.25**		

Note—Rates noted in **bold face** type are only approximate.
W. W. Battie & Co.'s Coal Trade Freight Report.

OCEAN CHARTERS

Coal charters have been reported by the "Journal of Commerce" as follows:

Vessel	Nationality	From	To	Tons	Rate
Rio Pirahy	British	Baltimore	Genoa	2297	
Signe	Norwegian	Baltimore	Havana	1302	
Alice May Davenport		Norfolk	Para	952	$4.50
Edith H. Symington		Norfolk	Charleston	881	0.95
Fannie Palmer		Norfolk	Rio Janeiro	1726	5.60
Jacob M. Haskell		Norfolk	Pernambuco	1362	6.00
Augustus H. Babcock		Norfolk	Pernambuco	1299	
Isabelle B. Wiley		Philadelphia	Paramaribo	611	
Geo. W. Truitt, Jr.		Norfolk	Savannah	647	1.15
Laura C. Anderson		Baltimore	Key West	766	

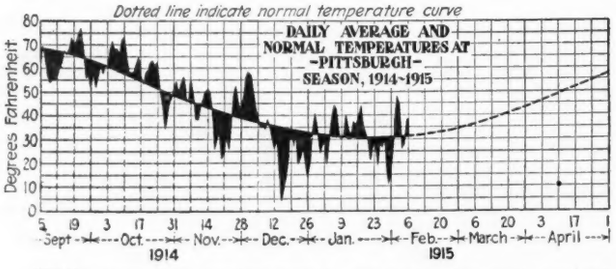
Note—Steamers are indicated by **bold face** type, all others being schooners.

OHIO VALLEY

PITTSBURGH

Demand slightly improved in some quarters. Negotiations on Apr. 1 contracts not yet under way. Prices unchanged. Operations at close to 60% of capacity.

Domestic demand is now at a fair rate, the weather being moderately cold, while the dealers, not having laid in any stocks to speak of, are steady buyers. There has been a slight additional increase in demand from manufacturers, but chiefly on regular contracts, purchases of free coal by manufacturers being light. Railroad consumption is about the same as earlier in the year.



While very few twelve-month contracts for coal expired Dec. 31 there is a relatively large number to expire Mar. 31. So far as can be learned no active negotiations are yet under way and both buyers and sellers seem to be somewhat reserved. The buyers expect to be able to close at lower rates than a year ago and the sellers probably feel that the expectation is more or less justified by conditions.

There is about the usual amount of shading on free coal as demand is not heavy and operators are usually found who are anxious to dispose of a limited tonnage. Ordinary quotations remain as follows for prompt lots: Slack, 90c.@$1; nut and slack, $1.05; nut, $1.10; mine-run, $1.15; ¾-in., $1.25; 1¼-in., $1.35, per net ton at mine, Pittsburgh district. Mining operations in the district are at close to 60% of capacity.

COLUMBUS

Warmer weather has again slackened the demand. Operations less active than formerly and buying is limited. Small sizes still strong.

The higher temperatures of the past week have caused a decrease in the domestic demand and buying from this time on will be from hand to mouth. The tone of the market is not as good as formerly and future prospects are dependent upon weather conditions.

Stocks in the hands of retailers are larger and with the coming of the warmer weather they have not been selling as much. Contrary to the usual custom, there were fewer cancellations of orders during the recent warm spell than formerly. Dealers have been content to let shipments come forward, taking their chances on some wintry weather before spring. A strong preference for Pocahontas and the fancy grades is still shown in the retail trade. Hocking lump is also in good demand. Retail prices are firm at the levels which have prevailed for some time.

Steam business is still slow and there are no hopes for immediate improvement. Railroads are taking a little more tonnage for the movement of trains. Ordinary manufacturing is not improving much. Quite a few steam contracts expire soon and considerable attention is being devoted to their renewal. The best feature of the steam trade is the demand for fine sizes which are firm because of the curtailed production of lump. Nut, pea and slack is quoted as high as 70c. and coarse slack bout 10c. less.

Production during the past week has shown a decrease due to the warmer weather and also to floods which have put a number of mines in the Pomeroy Bend district out of commission. The Hocking Valley produced about 45% of normal and the same figures prevail in the Crooksville, Cambridge and Jackson district. Pomeroy Bend produced about 60 per cent.

Prices in the Ohio field are:

	Hocking Valley	Pomeroy	Kanawha
Rescreened lump	$1.50	$1.60	.....
Inch and a quarter	1.45	1.50	$1.45
Three-quarter inch	1.35	1.40	1.35
Nut	1.15	1.25	1.15
Mine-run	1.05	1.10	1.05
Nut, pea and slack	0.65	0.70	0.65
Coarse slack	0.55	0.60	0.55

CINCINNATI

Milder weather, and lack of railroad and industrial buying have set the trade back and prices are lower. Prospects are not encouraging.

The absence of any winter weather has enabled domestic consumers to get along with less fuel than heretofore, which, together with the continued industrial depression, has forced the market to a lower level than for some time. Prices have been substantially reduced, consignment mine-run being offered in small quantities as low as 75c., with quotations of 95c. at the mines. As usual, however, reductions have failed to stimulate immediate buying, large consumers continuing to hold off, awaiting the expected revival in business.

Some members of the trade continue optimistic for an active spring business. The railroads are expected to be heavy buyers of all kinds of supplies, which will aid the manufacturing industries materially. But at the moment the market is about as slow as it could be, and producers have relinquished hopes of any real winter business.

COKE

CONNELLSVILLE

Continued light demand for prompt furnace coke and prices a shade easier. Production by furnace ovens sharply increased, owing to more steel-works furnaces blowing in.

Demand for coke from the merchant operators has not increased, as blowing in of blast furnaces is still confined to steel interests that make coke themselves. Their coke production has been increased very considerably, while the merchant ovens maintain the same gait as formerly. The prompt furnace-coke market has been under such continuous pressure, with coke constantly offered and scarcely any takers, that prices have receded a trifle further and standard grade can sometimes be picked up at $1.50, a total decline of 10c. within 30 days. The contracts made for three and six months at $1.65@1.70 now look much better to the operators than they did when made. There are no further developments in connection with the Thompson failure at Uniontown. The market is quotable as follows: Prompt furnace, $1.50@1.55; contract furnace to Apr. 1, $1.60; prompt foundry, $2@2.40; contract foundry, nominal, $2.15@2.35, per net ton at oven.

The "Courier" reports production in the Connellsville and lower Connellsville region in the week ended Jan. 30 at 242,608 tons, a gain of 28,398 tons, made entirely by the furnace ovens, and shipments at 240,240 tons, an increase of 28,233 tons.

Buffalo—Shippers are obliged to be content with supplying the ordinary demand and watching for the expected stir in the iron market that must take place before there is any up-

turn in coke. Prices appear to be at the bottom, so that when any change does take place it will have to be for the better. Quotations rule on the basis of $4.25 for best Connellsville foundry and $3.30 for stock coke.

Columbus—Coke trade is more active in central Ohio and prices are ruling firm all along the line.

Chicago—Shipments of domestic coke have been absorbed as fast as made at good figures. There has been some recession in the prices of furnace and foundry coke for which the demand is indifferent. Prices are as follows: Byproduct, $4.60@4.95; Connellsville, $4.60@4.80; Wise County 72-hr. (select), $4.60@4.75; gas coke, $4@4.25.

SOUTHERN

BIRMINGHAM

Orders light, dealers holding off for spring prices. Steam grades show a very slight improvement.

A few scattering orders have been received for lump coal, but the tonnage moved is very light. The dealers are probably waiting until the spring prices go into effect on the first of the month, which will mean a reduction of about 50c. per ton on the regular schedule, although the prices now being obtained are but very little higher than the spring circular.

Steam coal, while showing some slight improvement, is far from normal, though some inquiries are being received on requirements for contracts. Shipments are light, and prices remain about the same. Blacksmith coal is moving satisfactorily, but the tonnage from now on will begin to fall off. There is practically no change in the pig-iron situation.

LOUISVILLE

Steam movement continues slow and the market is generally soft with prices weak.

The movement of the steam sizes has not shown any considerable improvement, although it is more active than for several weeks. Generally speaking the market is soft. Top prices are $1.75 for block coal, 90c. to $1 for 6-in. run-of-mine and 60 to 70c. for nut and slack, all prices f.o.b. mines. The range is downward from these figures, with summer prices more or less generally prevailing.

MIDDLE WESTERN

INDIANAPOLIS

Mines working only half-time. Steam grades moving slowly. Domestic lump in fair demand, but not up to normal. Prices unchanged at the mines.

The weather has been milder but not sufficiently so to make much difference in the consumption. The domestic lump trade is still the best factor and is just now feeling some impetus from a restocking movement.

The steam trade is somewhat draggy and operators have about concluded it will not improve much until the usual spring acceleration. Mine prices are: 75c. for screenings; $1 to $1.10 for mine-run; $1.25 for steam lump; $1.65 for best domestic lump. Some small "independents" in the city are cutting retail prices 25 to 50c. a ton under the schedule of the members of the retailers association. The prevailing retail prices are:

Anthracite chestnut	$8.50	Kanawha lump, forked	$4.75
Anthracite egg and stove	8.25	Hocking lump, forked	4.75
Anthracite grade	8.00	Hocking washed egg	5.00
Pocahontas lump, forked	6.25	Luhrig lump, forked	4.75
Pocahontas lump, shoveled	5.75	Luhrig washed egg	5.00
Pocahontas mine run	4.75	Linton No. 4 lump, forked	3.75
Pocahontas nut and slack	3.75	Indiana lump, forked	3.50
Blossburg smithing	5.50	Indiana lump and egg, screened	3.00
Cannel lump	6.50	Connellsville lump coke	6.50
Jackson (Ohio) forked	5.50	Indianapolis by-product coke	6.50

CHICAGO

Prices sagging and domestic demand sluggish. Steam coals soft. Anthracite business steady.

Mild weather has ruled during the past week and the tendency has been towards a slackening demand and softening prices. A small amount of demurrage coal is now on track and it is reported that consignment coal from all directions is en route to this market. It becomes increasingly difficult to quote staple prices for this market.

The West Virginia smokeless coal has fallen off as much as 50c. in the price of lump. Some of the operators are trying to hold to old figures on prepared sizes, but most of them seem to have abandoned circular quotations and are slaghtering prices.

Most of the Illinois domestic coal is being sold at $1.50, and a considerable quantity of Indiana domestic has been disposed of in the open market at $1.40. Screenings are averaging 60c. to 65c., and the indifferent absorption tends to bearishness.

Franklin and Williamson County domestic coals sold as low as $1.35 but screenings are slightly firmer than elsewhere in Illinois. Saline County coals are also weak.

The Indiana mines are averaging about three days per week, and it is evident that some of the operators are trying to force the market. Considerable 6-in. lump from the No. 5 vein is being sold in the Indianapolis market as low as $1.25

There is a little better movement of lump from the Springfield district, and screenings have been sold as low as 55c.

It is still hard to obtain fixed prices on Eastern Kentucky coals; it is reported that quite a tonnage of consignment coal is being sacrificed at low figures and it is evident that the area of distribution is widening.

Some Hocking coal on demurrage has been sold at sacrifice prices, but shipments from the mines seem to be at list.

A dull tone seems to prevail in anthracite. Independent operators are quoting prices 10c. to 30c. below circular, but there is little free coal on hand. The demand for egg seems to be improving, and chestnut is steady.

Prices f.o.b. mines are as follows:

	Franklin Co.	Springfield	Sullivan	Clinton	Carterville
Lump	$1.50@1.75	$1.50	....	$1.50@1.60	$1.50@1.75
4-in. lump	....	....	$1.40@1.65	....	....
Steam lump	....	....	1.25@1.35	1.20	....
2½-in. lump	....	....	1.25@1.50	....	....
1¼-in. lump	....	....	1.25@1.40	....	....
Mine-run	1.15@1.25	1.05	1.10	1.10	....
Egg	1.35@1.75	1.35@1.50	1.35	1.40@1.50	1.50@1.75
No. 1 washed	....	....	....	....	1.60@1.75
No. 2 washed	....	....	....	....	1.40@1.65
6x3-in. egg	....	....	....	....	....
Nut	....	1.25@1.55	1.15@1.30	1.15@1.25	....
No. 1 nut	1.50@1.75	....	....	....	....
No. 2 nut	1.35@1.50	....	....	....	....
Screenings	0.60@0.75	0.55@0.65	0.60@0.65	0.60@0.75	....

	Harrisburg	E. Kentucky	N. Riv. & Poca.	Somerset	Hocking
Lump	$1.40@1.65	$1.60@2.00	$1.50@2.00	$1.75@2.00	....
1¼-in. lump	....	1.40@1.75	....	....	$1.40@1.60
Lump & egg	....	....	1.50@2.00	....	....
Mine-run	1.10	....	1.40	1.10@1.25	....
Egg	1.35@1.50	1.15@1.60	1.60@1.75	1.75@2.00	....
No. 1 nut	1.40@1.65	....	1.50@1.75	....	....
No. 2 nut	1.25@1.50	....	....	....	....
Screenings	0.65@0.75	....	....	....	....

KANSAS CITY

Wholesale business slow and at slightly lower prices than last year. The market is heavy due to the over-production. Zero weather relieved the tension slightly.

Coal dealers, both wholesale and retail, are hoping that spring will bring a resumption of activities in industrial lines as this is the only thing that will relieve the sluggishness in the Kansas City market. An instance of the curtailed consumption is the closing of half a dozen large cement factories in western Missouri. Several trainloads a day of steam coal are shipped to these plants alone when in operation. Overproduction is reported as a result of a general lessening of the demand.

Shipments to or from Kansas City have been light, with practically no movement of coal Westward. Prices have not declined, but remain at a low level. Steam coal is selling at from 2 to 10c. lower than at this time last year, a margin which is improved slightly over the December record. Extremely cold weather toward the close of January stimulated the domestic demand so that the trade in lump and nut is not so much affected by the over-production.

ST. LOUIS

Coals of all kinds selling at less than cost. Steam grades demoralized. Heavy over production. Curtailment of operations.

Coal from all fields is now going at a figure below the cost of production. The local market is unable to take care of the tonnage offered, and it is impossible to get prices back to where they should be, with the surplus that is continually coming in. Weather conditions are not favorable and the continued business depression has demoralized the steam market.

Only those who have the greater portion of their tonnage under contract are opimistic; shippers in the open market are having an extremely hard time of it and there is nothing in sight to indicate better conditions, unless it is a severe spell of real winter weather. This would bring relief in some quarters, and perhaps better prices.

The over-production is the worst in the Williamson and Franklin County field and it is expected that the coming week will see a curtailment on the part of the larger operators.

A small tonnage of anthracite moved in during the past week or ten days, but there is no general demand for it. Smokeless has dropped out of the market almost entirely.

The prevailing circular is:

	Williamson and Franklin Co.	Big Muddy	Mt. Olive	Standard	Sparta
2-in. lump	.....	$2.00	$1.25	....	.....
3-in. lump	.....	....	1.40	....	.....
6-in. lump	$1.30@1.60	....	1.50	$1.15@1.25	$1.25
3x6 egg	1.25@1.45	....	.....	1.00@1.10	.....
No. 1 nut	1.15@1.30	....	.....	0.90@0.95	.....
Screenings	0.65@0.70	....	.....	0.40@0.45	0.50
Mine-run	1.05@1.10	1.50	.....	0.80@0.85	.....
No. 1 washed nut	1.65@1.75	2.00	1.60	....	.....
No. 2 washed nut	1.30@1.40	....	....	....	.....
No. 3 washed nut	1.15@1.20	....	.....	....	.....
No. 4 washed nut	1.10@1.15	....	.....	....	.....
No. 5 washed nut	0.40@0.50	....	.....	....	.....

MILWAUKEE

Summary of situation for the past season. Tonnage falls below the previous year.

Milwaukee experienced a falling off in coal receipts during 1914, but the showing is better than was expected. The receipts aggregated 5,120,543 tons, against 5,551,478 tons in 1913, a loss of 430,965 tons, or 7.8%. Of this loss 183,450 tons must be credited to hard coal and 247,515 to soft the grades. According to the records of the canals at Sault Ste. Marie, Mich., the ports on Lake Superior suffered a decline of 22.4%.

There were two reasons for this falling off in so far as Milwaukee is concerned, and the same is no doubt true of competing ports. The unusually mild winter of 1913-14 left the yards with much larger stocks on hand than is usual at the onset of summer, and the slow outward movement due to the industrial depression throughout the country added to the backwardness of the situation. The loss in receipts was quite evenly distributed throughout the calendar months. All but two months of the season show declines from the records of 1913, July making a gain of 206,807 tons and August 97,676 tons. December receipts were unusually light, because of the fact that all of the yards were loaded to the utmost limit. This lack of storage room checked receiving business at the close. There are a few cargoes afloat in the harbor at present, but not as many as is the case in normal years.

Dealers report a more satisfactory condition of business than was experienced in the fall. The unusually sharp weather during the first few weeks of winter stimulated the movement of anthracite coal for heating purposes, while a noticeable betterment of conditions in manufacturing sections led to increasing sales of steam coal. While the average temperature has not been severe, it is cold enough to call for a steady consumption of fuel. The prospect is that the coming spring will find the various yards in a much more satisfactory condition than they were at the beginning of the receiving season of 1914.

The following table compiled by the Lehigh Valley Coal Sales Co. shows the wholesale prices of coal at Milwaukee during the year 1914:

Mo.	Wyoming and Cross Creek Anthracite, Egg, Stove and Nut		Pocahontas Screened	Cannel Kentucky	Steam Coal Splint	Hock.	Screened Yough.	Pocahontas Mine Run
Jan.	$6.83	$7.08	$5.25	$6.75	$3.55	$3.55	$3.55	$3.50
Feb.	6.83	7.08	5.25	6.75	3.55	3.55	3.55	3.50
Mar.	6.83	7.08	5.25	6.75	3.55	3.55	3.55	3.50
Apr.	6.35	6.60	4.75	6.75	3.55	3.55	3.55	3.50
May	6.45	6.70	4.75	6.75	3.55	3.55	3.55	3.50
June	6.55	6.80	4.75	6.75	3.55	3.55	3.55	3.50
July	6.65	6.90	4.75	6.75	3.55	3.55	3.55	3.50
Aug.	6.76	7.00	4.75	6.75	3.55	3.55	3.55	3.50
Sept.	6.85	7.10	4.75	6.76	3.55	3.55	3.55	3.50
Oct.	6.85	7.10	4.75	6.75	3.55	3.55	3.55	3.50
Nov.	6.85	7.10	4.75	6.75	3.55	3.55	3.55	3.50
Dec.	6.85	7.10	5.00	6.75	3.55	3.55	3.55	3.50

PORTLAND

Steamer "Cricket" arrives with 500 tons of Pennsylvania anthracite. Cool weather moderates and lighter business is expected from now on. Prolonged cold weather helped the situation but the winter business has not been good. Western mines reduce prices.

The American steamer "Cricket" has arrived here with 500 tons of Pennsylvania anthracite for the Independent Coal & Ice Co. The vessel was delayed getting here because of towing another vessel through the Canal.

The cool weather that has prevailed for several weeks is now begining to moderate and it is expected that the domestic demand will fall off. In spite of the cold weather, dealers say that the volume of business this winter was not up to the expectations, consumers having bought sparingly and not more than absolutely necessary.

The Pennsylvania anthracite is selling at $14 per ton retail, and half tons at the same rate, this price being quoted on account of the shipment arriving after the break in the cold weather.

Wholesalers here are getting the benefit of rate cutting between the Utah and Wyoming mines to the extent of 50c. a ton, but as there is no telling how long the reduction will continue the cut has had no effect on retail prices.

SPOKANE

Coal war between Wyoming and Utah operators for the markets of Idaho.

Although a coal war has broken out in southern Idaho in the vicinity of Nampa, coal prices in other parts of this section remain steady. Naturally this trouble is benefiting the consumers there, having reduced the price of coal to a large degree. The fight seems to be between the Wyoming and Utah operators and was brought about through a charge of boycotting the Wyoming coal.

Spokane and vicinity are finding no fluctuation in coal prices and the quality that was prevailing last year has been improved. Unless a decided change in the weather is made, there is no expectation of any change in prices.

PRODUCTION AND TRANSPORTATION STATISTICS

ANTHRACITE SHIPMENTS

Anthracite shipments for January, 1914-15, and the twelve months of 1914-13, were as follows:

	January		12 Months	
	1915	1914	1914	1913
Phila. & Reading	760,757	1,015,126	11,998,779	12,914,887
Lehigh Valley	954,072	810,588	13,136,759	13,011,370
Cent. R.R. N.J.	608,296	704,491	8,924,936	9,092,433
Del. Lack. & West.	575,538	618,938	9,912,578	9,903,541
Del. & Hudson	623,947	586,893	7,313,541	7,094,258
Pennsylvania	451,200	536,118	6,434,937	6,351,756
Erie	577,007	706,303	8,268,585	8,192,352
Ont. & Western	183,718	197,275	2,352,486	2,509,031
Lehigh & New. Eng.	96,794	104,912	.....	.....
Total	4,831,329	5,280,644	68,342,601	69,069,628

Stocks at Tidewater Jan. 31 were 798,125 tons as compared with 669,833 tons Dec. 31.

PENNSYLVANIA RAILROAD

The following is a statement of shipments over the P. R.R. Co.'s lines east of Pittsburgh and Erie for December and twelve months of 1913 and 1914, in short tons:

	December		Twelve Months	
	1914	1913	1914	1913
Anthracite	977,929	1,012,125	11,201,150	10,711,335
Bituminous	3,755,675	4,354,729	47,769,227	51,526,267
Coke	621,774	880,962	9,548,354	13,892,825
Total	5,355,378	6,247,316	68,518,731	76,330,427

BALTIMORE & OHIO

The following is a statement of coal and coke tonnage moved over this system and affiliated lines during October, November and December of 1914:

	October		November		December	
	1914	1913	1914	1913	1914	1913
Coal	2,662,377	3,250,220	2,324,271	2,939,975	2,227,899	3,005,914
Coke	208,866	388,337	185,466	343,387	232,594	269,998
Total	2,871,243	3,638,557	2,509,737	3,283,362	2,460,493	3,275,912

SOUTHWESTERN TONNAGE

The following is a comparative statement of the Southwestern tonnage for October and the preceding two months of the years 1913 and 1914:

	August		September		October	
State	1913	1914	1913	1914	1913	1914
Missouri	178,949	201,992	250,763	233,195	317,466	280,958
Kansas	451,968	453,675	474,237	569,114	609,827	632,784
Arkansas	178,904	157,803	201,782	160,233	209,693	186,990
Oklahoma	289,949	244,103	297,213	254,973	340,915	319,439
Totals	1,099,770	1,057,573	1,223,995	1,217,515	1,477,901	1,420,171

I. C. C. No. 6464—Crows Nest Pass Coal Co. vs. Great Northern Ry. Co.

Demurrage charges on certain cars of coal at Republic, Wash., found to have been assessed in accordance with tariff provisions and complaint dismissed.

FOREIGN MARKETS

GREAT BRITAIN

Jan. 29—The market is firm for both prompt and forward loading. Quotations are approximately as follows:

Best Welsh steam	$4.92@5.04	Best Monmouthshires	$4.26@4.32
Best seconds	4.56@4.68	Seconds	3.78@3.90
Seconds	4.32@4.44	Best Cardiff smalls	3.42@3.54
Best dry coals	4.56@4.68	Cargo smalls	2.88@3.12

The price for Cardiff coals are f.o.b. Cardiff, Penarth or Barry, while those for Monmouthshire descriptions are f.o.b. Newport, both net, exclusive of wharfage.

Freight—Rates generally remain at very high levels and are today approximately as follows:

Gibraltar	$6.00	Naples	$7.20	Las Palmas	$5.28
Malta	6.48	Venice, Ancona	9.00	St. Vincent	5.52
Marseille	5.79	Alexandria	7.20	Rio Janeiro	7.08
Algiers	6.17	Port Said	7.20	Monte Video	6.24
Genoa	5.79			River Plate	6.48

CONSULAR NOTES

The American Consular Office has been informed by an agent in one of the Mediterranean countries that he desires the address of American exporters of coal who are prepared to furnish large quantities. It is stated that this man has placed a large trial order with his government. References are given. Delivery is to be made at destination.

FINANCIAL DEPARTMENT

Lackawanna Coal & Lumber Company

President W. L. Connell of this company reports under date of Oct. 1, 1914, as follows:

Summary of Properties—When the improvements and plans now under way are completed, the company will have: (1) Paint Creek Collieries Co. operating eight thoroughly equipped mines. (2) Griffith Collieries Co. operating a large colliery on the Coal River property. (3) Highland Lumber Co., operating one mill at Seth, W. Va., and two mills in Virginia. (4) Merchandise sales of 10 stores and rents of 1200 houses. These operations include only the first of many mines to be opened on the 53,000 acres owned in fee, and take no account of any profits realizable from natural gas. When these additional sources of profit become effective, the net earnings, the management believes, will be sufficient not only to pay its fixed charges, but to provide a surplus for dividends on the stock.

Paint Creek Collieries Co.—This company, whose capital stock is nearly all owned, has under lease 14,235 acres in two tracts on Paint Creek and Brier Creek in Kanawha and Fayette counties, W. Va., including 950 acres recently acquired. It is now operating 8 mines, which it is improving, electrifying and equipping, viz.: (1) Paint Creek Mine, completely operated by electricity, with large modern tipple, 36,000 ft. of track, 2 electric main haulage locomotives, 10 electric gathering locomotives, 10 electric undercutters and 500 mine cars. Except for a retarding conveyor, already ordered, the mine is completely modernized. (2) Banner Mine lies on the opposite side of the mountain from Paint Creek mine and is working the same seams of coal from the opposite direction. (3) Grose Mine, to be modernized for operation electrically on the same general plan as at Paint Creek Mine, with erection of a modern tipple, retarding conveyor, several hundred cars, etc. Contracts for equipment already let. (4) Scranton and Wacomah mines, scheduled for early improvement; new equipment is on the way to increase the capacity. (5) Green Brier mine, now being reopened. With the new tipple completed in November, will add at least 1000 tons per day to production of Paint Creek mines. (6) Detroit mine, also being re-opened; when the tracks are re-laid in Nov. 1914, will provide an additional tonnage of 750 tons per day. (7) Reynolds mine on Brier Creek. Completely re-built and furnished with new coal-handling and screening equipment. When the inside workings are fully developed should produce 1200 tons per day.

Upon the completion of the improvements now under way at the mines of the Paint Creek Collieries Co., and the installation of the electrical appliances in our sub-stations, thereby giving to the various operations their maximum electrical power, there is no reason why the output of the Paint Creek Collieries Co. should not exceed 1,000,000 tons per annum.

Wages—The basis first offered to the employees was refused and the strike of 1912 was called, which lasted for 18 months, the men not only being idle, but some of the tipples destroyed and many improvements laid waste. Finally, a new basis of wages was fixed upon and the company enjoyed peace for a period of 8 months, during which it had to reorganize its working forces and re-establish the market for its coal. In 1914 the Paint Creek Collieries Co. entered upon separate negotiations with the miners, with the result that the scale agreed upon eight months before was re-established, with the exception that the rate paid for mining splint coal, was fixed at 29c. per ton subject to arbitration, and has since been fixed at that figure by decision of five arbitrators. This basis for machine mining upon the Paint Creek Collieries will remain undisturbed for a period of three years. The scale of wages is now as low as that paid by any mining company in the Kanawha district and places the mines upon a fair and profitable basis.

Griffith Collieries Co.—The Chesapeake & Ohio Ry., which now reaches Seth on the Coal River property, has announced its intention to extend its Coal River branch for a considerable distance through our lands to connect with its Cabin Creek branch at Whitesville. This will open up an entirely new section, much of which it is proposed to lease for development on a royalty basis. The first such contracts have been made with the Griffith Collieries Co., a subsidiary of the Lackawanna Coal & Lumber Co., which owns all its capital stock and will receive not only a royalty on the coal mined, but the profits above fixed charges. The Griffith Collieries Co. has leased 2500 acres and will erect at the terminus of the company's own railroad a colliery with a capacity of 4000 tons per day. A tram road 3½ miles long has been graded to bring the coal to the tipple and plans for the tipple and coal-handling equipment are ready. The plans provide for the model mining town of Griffith (all owned by the company), with 300 to 500 houses for mine workers (large boarding-house already completed), and lighted from one of our neighboring gas wells. The Griffith lease contains six veins of coal, four above water level. Veins thick and of high quality.

Highland Lumber Co., Inc.—This subsidiary of the Lackawanna Coal & Lumber Co. has combined all of the latter's lumber operations, and has taken over its locomotives, cars, logging equipment and lumber business generally in West Virginia for a cash consideration and will pay an annual rental for its mill, houses, store and other buildings at Seth and $4 per 1000 ft. for all timber cut from its lands. The ownership of the mill and all the standing timber is still vested in the Lackawanna Coal & Lumber Co., which also owns all the common stock of the Highland Lumber Co., Inc., and will receive all of that company's profits on both the West Virginia and Virginia operations after fixed charges and dividends on such prefered stock as may be issued. The Lumber Co. is preparing to construct a railroad and two mills on its 30,000-acre tract in Virginia The profits per 1000 ft. should be even larger than at Seth, where $108,000 was earned last year.

Company Stores, Etc.—The Paint Creek Collieries Co. is now operating six stores and rents over 600 houses to its mine workers and the Highland Lumber Co. conducts a highly successful store at Seth and rents 50 houses to employees. Eventually, with the town of Griffith fully established, there will be, in all, at least 1200 houses and 10 stores.

Prospecting for Gas and Oil—The prospecting of the properties for gas and oil has met with promising results. One gas well, producing 500,000 cu.ft., has been struck in Nicholas County, and the towns of Swiss and Jody are now supplied therefrom. On the Coal River property in Boone County, 5 gas wells have been developed, having a total capacity of 4,750,000 cu.ft. per day, and the town of Seth is being supplied from one of them. Two other wells are now being drilled on this property. The striking of gas in five widely separated localities in Boone County, it is thought, indicates that at least 10,000 acres of the property is underlaid with natural gas.

BALANCE SHEET OF LACKAWANNA COAL & LUMBER CO.

Assets—	Sept. 1 '14	June 1 '13	Liabilities—	Sept. 1 '14	June 1 '13
Coal in ground	$25,816,970	$25,816,970	Capital stock	$12,000,000	$12,000,000
Lumber stumpage	526,473	600,000	Bonds and tr. notes	12,026,550	9,335,850
Paint Cr.C.Co. stk	*2,522,000	2,250,000	Notes payable and liens	399,961	657,367
Other investments	475,730	.....	Accts. payable	64,358	77,787
Lumber in yard, etc.	199,116	140,023	Accrued int.	338,057	127,444
Saw-mill, RR., etc.	259,635	293,884	Surplus	6,036,919	7,370,803
Cash and securities	163,640	197,964	Total	$30,865,845	$29,569,253
Accts. and notes rec.	902,281	270,412			
Total	$30,865,845	$29,569,253			

* Paint Creek Collieries Co. stock, $2,522,000, as above, includes common, $1,000,000; preferred, $1,522,000.

Coal Contracts Pending

Contracts listed in this department are authoritative in every respect except where the source of information is questionable, in which event it is noted. All contracts are listed promptly on receipt and only repeated when additional information becomes available or in the last issue previous to the day on which bids will be closed. Liberal remuneration will be paid for all legitimate notices of this kind sent in.

Contract No. 73—Washington, D. C.—Sealed proposals will be received until 11 a.m., Feb. 15, for furnishing and delivering bituminous coal, either at Washington, D. C., or at Alexandria, Va., for the steamer on duty at Fort Washington, Md. (p. 275). Address, J. B. Houston, Depot Quartermaster, Washington, D. C.

Contract No. 81—Philadelphia, Penn.—Sealed proposals will be received until noon, Feb. 17, for furnishing and delivering about 29,000 tons of bituminous coal to the floating plant employed in the Philadelphia Engineer District of the United States Government during the period beginning Mar. 1, 1915, and ending June 30, 1916 (p. 275). Address, Col. Geo. A. Zinn, 815 Witherspoon Building, Philadelphia, Pennsylvania.

Contract No. 84—New York, N. Y.—Sealed bids will be received until 10:30 a.m., Feb. 15, for furnishing and delivering 75 tons of stove coal. A deposit of 1½% of the amount involved must accompany each bid and the contract to be completed during the current year. Address Contract Clk. Lamb, Room 1034, Department of Charities, Municipal Bldg., New York.

Contract No. 85—Baltimore, Md.—Henry Sonneborn & Co., Pratt and Paca Sts., Baltimore, will be in the market about March. 1, for 3500 to 4000 tons of standard mine-run coal. Address Pur. Agt., A. Mainzer, Baltimore, Md.

Contract No. 86—Hinsdale, Ill.—The Municipal Electric Light Plant, at this place, will be in the market about the first of next month for 4000 tons of screenings. The approximate cost is 90c. per ton at the mine and Purity coal is commonly used. The contract is let on a competitive basis. Address, Mgr. H. H. Bristol, Municipal Electric Light Plant, Hinsdale, Ill.

Contract No. 87—New York, N. Y.—Sealed bids will be received until 11 a.m., Feb. 18, for furnishing and delivering anthracite and semi-bituminous coal. The security required will be 30% of the total bid and delivery is to be made as may be directed. Address Comr., Katherine Bement Davis, Department of Correction, Municipal Bldg., New York.

Contract No. 88—Vincennes, Ind.—The City Electric Lighting Co., at this place, contracts for about 5000 tons of mine-run coal and screenings sometime during March. The approximate cost is $1.45 for mine-run and $1.15 for screenings and the business is done on a competitive basis. Address Mgr., A. J. Hetz, The City Electric Lighting Co., Vincennes, Indiana.

Contract No. 89—Washington, D. C.—Telegraphic bids were requested by the Bureau of Supplies and Accounts ,Navy Dept., Washington, until noon, Feb. 10, for either the transportation of coal or coal and transportation, delivery to be made at the naval coaling station at Key West, Fla., and Portsmouth, N. H. About 5000 tons are required at Key West and 12,000 tons at Portland, deliveries to be started before Mar. 1, 1915 and completed by Mar. 20. Bidders were to state dates on which deliveries were to be made. A daily discharge rate of 400 tons at Portsmouth and 350 tons at Key West is guaranteed. Address Paymaster-General of the Navy, Samuel McGowan, Washington, D. C.

Contract No. 90—New York, N. Y.—Sealed bids will be received until 10 a.m., Feb. 17, for furnishing and delivering 350 gross tons, more or less, of anthracite coal. The security required will be 30% of the total bid and a certified check of 5% must accompany each bid. Delivery will be as required and the contract is to be completed before Mar. 1. Address Chn. of the Comn., Alrick H. Man, Board of Trustees of Hunter College, Dept. of Education, Park Ave. and 59th St., New York.

Contract No. 91—Jackson, Ohio—Bids were received on Feb. 1, for furnishing coal to the electric light plant for a period of eleven months ending Dec. 31, 1915. Bids were to specify the kind, grade, quality and cost per ton of 2000 lb., delivered in bins at the electric light plant in such quantities as required. Address Dir. of Pub. Ser., R. L. Lamb, Jackson, Ohio.

Contract No. 92—Kennebunk, Maine—The electric light department, at this place, will be in the market about Mar. 1 for 375 long tons of Georges Creek coal. The usual contracting figure is about $5 per ton. The award is made on a competitive basis. Address Supt. I. H. Wells, Electric Light Dept., Kennebunk, Maine.

Contract No. 93—Jersey City, N. J.—Bids will be received until 10 a.m., Feb. 24, for furnishing and delivering 2500 gross tons of best quality pea coal at the power house. Address, Clk. of the Bd., John C. Sweeney, Boulevard Commissioners, County Court House, Jersey City, N. J.

CONTRACTS AWARDED

Contract No. 47—Batesville, Ark.—This contract (p. 231), which provides for furnishing about 1800 tons of mine-run coal, has been awarded to the McAlister Fuel Co. at $1.75 per ton. Address Supt., W. H. Walkup, Batesville Water & Light Plant, Batesville, Ark.

Contract No. 64—Columbus, Ohio—The bids on this contract (p. 231) which provides for furnishing 725 tons of bituminous lump coal were as follows, per ton: Dublin Avenue Coal Co., $2.472; Homer C. Gill, $2.45; Fletcher-Williams Coal Co., $2.39; M. A. Suydam & Co., $2.34; George J. Igel, $2.34 (awarded contract). Address Dir. of Pub. Safety, B. L. Barger, Columbus, Ohio.

Contract No. 68—Sheridan, Wyo.—This contract (p. 231) which provides for furnishing and delivering screened lump coal within the city, for one year, commencing Feb. 5, has been awarded to Jack Gregg, Sheridan, at $4940. Address, County Clk. James J. Withrow, Sheridan, Wyo.

CONTRACT NOTES

The Townsend Grace Co., Baltimore, Md., consumes about 1400 tons of Ralphton grade coal. Address the Pur. Agt., S. G. Wolf, Townsend Grace Co., Baltimore.

The Celina Electric Light & Water Wks. has awarded a contract to the Kanawha Valley Coal Co., Charleston, W. Va., for furnishing coal at 85c. per ton for Logan mine run. Address Supt., C. W. Howard, Celina Electric Light & Water Wks., Celina, Ohio.

Bernheimer Bros., Baltimore, Md., use about 500 tons of standard mine-run soft coal per month. At present no contract exists. Address, Herman Bernheimer, of Bernheimer Bros., Baltimore.

The Secretary of the Interior, Washington, D. C., has awarded a contract for furnishing 2000 tons of coal for use on the work in connection with the storage unit of the Yakima Irrigation Project, to the Roslyn Fuel Co., North Yakima, Wash., at $2.75 per ton.

The Emerson Tower Bldg., Baltimore, Md., uses about 500 tons of coal annually. Address the Pur. Agt. Parker Cook, Baltimore, Md.

Hamburger Bros. & Co., Baltimore, Md., use from 350 to 400 tons of soft coal per month. In general, this company buys under contract, but at present gets its supply in the spot market. Address the Pur. Agt. Philip Hamburger, 16 South Eutaw St.

The Commission of Paducah, Ky., is having tests made of the pea and slack coal submitted by four companies who are bidding for furnishing the city's coal supply for 1915. The contract provides for about 250 tons of mine-run and 1500 tons of pea and slack coal.

L. Grief & Bro., Eutaw & German St., Baltimore, Md., buy 2000 tons of Georges Creek coal per year. This company usually purchases in the spot market, but will consider bids for furnishing contracts. Address the Pur. Agt., Rose Engle, Baltimore, Md.